# The Chemical Age

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*NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.*

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## Practical Research

PERHAPS the most striking passages in the new report of the Committee of Council for Scientific and Industrial Research are those that emphasise in the frankest way the utilitarian aims of industrial research. A practical rather than a theoretical objective is always, it is stated, the aim of industrial research, and unless research has that aim—directly and at a remove—it does not fall within the functions of the Department, or, indeed, within those of industry itself. The general idea is to assist industry in the coming years to move over from the empirical methods of the past to those of scientific direction and control. The Advisory Council of the Department find no grounds for anxiety in the field of pure science, though, in their view, the recent drift of scientific theory and other causes have led to the comparative neglect of certain spheres of inquiry which happen to be important at the moment for the development of industry. They consider the shortage of investigators to be particularly evident in the biological sciences, upon which the progress of agriculture and its allied industries throughout the Empire so intimately depends. In the field of applied research the duty of the Department is rather to stimulate than to replace private enterprise, save in certain directions where the needs of Government itself or the direct interests of large sections of the community justify the expenditure of public funds on a large scale over long periods for the solution of industrial problems. Outstanding examples quoted are the study of our fuel resources and of the preservation and transport of foodstuffs. The Committee of Council endorse this view and admit that in many cases industry has not in the past taken systematic steps to explore with the help of research the possible applications of new discoveries in pure science likely to lead to entirely new products or processes, though there is considerable evidence of a growing attention to the improvement of existing processes.

Lest, however, it should be thought that the Department undervalues pure research, the Committee of Council add that industry is undoubtedly concerned with pure research as much as with applied—for not only does it watch the output of university laboratories, seeking to find practical applications for the discoveries of the man of science who has worked with no utilitarian aim, but its own investigations in applied science reveal gaps in scientific theory which hold up advance in practice until they are filled. Thus the research with which the Department is concerned is practical in aim, whether it be pure or applied. When results have been obtained in the laboratory or on small scale plant, the practical aim takes the form of promoting their utilisation in industrial production—often the longest and the most costly part of the long series of experiments which began with an idea or a theory in the mind of a scientific man and ends at last in the foundation of a new industry or the revolution of an old process.

## Cross Cracking Process and Plant

THE contribution by Mr. F. Heron Rogers to the Institution of Chemical Engineers Conference last week was a very important one, and it cannot be doubted that this paper will be widely consulted by those interested in the subject. The cracking of petroleum bodies is assuming increasing importance, in view of the growing demand for petrol. The plant described by Mr. Rogers has many features of interest. The reaction chamber itself is a piece of chemical engineering plant which evidently involved much time and thought in its design and preparation. Its size is unusual, being 42 ft. long by 3 ft. 10 in. external diameter by 3 ft. 2 in. internal diameter. Made from a single ingot of open hearth steel, containing 0·25 per cent. carbon, with a phosphorus content not exceeding 0·06 per cent., it weighed originally 105–110 tons, as contrasted with a final weight of 45–50 tons.

The attention of our readers may be directed to the other special features of this reaction chamber. They are described in detail by Mr. Rogers and merit careful consideration, particularly the data on creeping tests at specific temperatures, and the effect of increasing temperature on the strength of carbon steel. What occurs to us is—was there any necessity for such an unwieldy reaction chamber? Could not it have been built in two or three or more units at much less expense? It is true that with several units the number of joints to be kept tight would increase correspondingly, but as no difficulty was experienced with the joints on the single large unit, it is safe to assume that trouble would not arise with the greater number of joints on the several small units. Apart from the reaction chamber, there are other interesting chemical engineering problems. The tubular furnace, or pipe still, involved careful consideration, as regards the method of securing the most effective heat transmission from the fuel employed, as indeed did the coupling of the tubes to the headers.

Important as are the chemical engineering problems discussed in the paper, it was evident from the discussion that from a chemical point of view research work is needed in several directions. Information is urgently needed concerning the relation between the chemical constitution and behaviour of the cracked spirits and other bodies in internal combustion engines, analytical methods for determining the unsaturated bodies in the presence of the aromatic ones, the relation between the nature of the petroleum bodies in the crude and cracked oils, and the extent to which it is possible to remove the gum-forming constituents when removing the unsaturated bodies. The Cross cracking process has certainly created considerable interest, and it is clear that many problems relating to the operation of cracking yet remain to be solved.

## Submerged Combustion

JUDGING by the patents that have recently been granted, a notice of some of which appeared in our last week's issue, it is clear that much valuable work has recently been done in developing this peculiarly attractive method of applying heat in the carbonisation, evaporation, and sublimation of substances which lend themselves to treatment in this way. Submerged combustion is not limited to any one fuel medium. On the contrary, its flexibility in this respect is striking. Producer gas, coal gas, carburetted water gas, blue water gas, carbon monoxide, hydrogen, oils of various qualities, and pulverised fuel can be utilised.

The application of submerged combustion is possible in two ways—direct and indirect. The direct method lends itself essentially to the evaporation of liquids which dissociate during such operation. For example, in the evaporation of solutions of ammonium chloride and ammonium nitrate, hydrochloric acid and nitric acid are respectively evolved. These acid gases attack the metallic parts of existing evaporators, causing heavy wear and tear. With the submerged combustion direct method, earthenware vessels can be used and corrosion can be avoided. By reason of the absence of heat transmission through the walls of the vessel, there is no strain, and no fracture is likely. Direct submerged combustion, however, is not limited in its application to the evaporation of liquids which dissociate. It can be usefully applied to the treatment of many other liquids. Where carbon dioxide or sulphur dioxide would mix with the steam by the direct method and thus lead to possible corrosion, it is clear that some other method of application of submerged combustion becomes imperative. It is for this reason that the metal bath method has been adopted as a suitable means of extending appreciably its application.

The indirect method lends itself to the sublimation of such substances as ammonium chloride in the production of salammoniac, of crude sulphur in the production of flowers or roll sulphur, of crude beta naphthol in the production of pure beta naphthol, etc. Where organic products are involved, better yields can be obtained, in that it is possible to maintain a constant temperature. Thus charring, the great source of loss with the existing methods of distillation and sublimation, is avoided. The distillation of tar and tar oils and the cracking of petroleum bodies can also with advantage be undertaken by the indirect submerged combustion method. Indeed, in this field alone the possibilities appear to be very great. In many cases the steam generated in the evaporation process can be utilised, either as a heating medium or in conjunction with turbines, for the generation of power. It is certain that submerged combustion will assume considerable importance in the near future.

## The Way the Money Goes

IT was suggested last week that to understand the Estimates now before Parliament and to be in a position to judge the Budget to be passed next month, a fuller knowledge of the real national position as a whole was necessary. However the question is approached, whether in a broad and general way or in a meticulous and detailed way, one cannot fail to be impressed by the difficulties of controlling the octopus of public finance. An examination of the figures of any department discloses a rate of growth which may be justified by the necessities of the work, but which is certainly not justified by the financial resources of the country. The Ministry of Health brings the problem into sharp relief. In 1871 we established the Local Government Board. By 1903 it had grown to be one of the most important departments of State and its expenditure had become £220,323. Twenty-five years later it is called the Ministry of Health and the bill to be paid is £19,443,593. Hazell's *Annual* for 1903 states that the Local Government Board was then the central department for poor law, public health, and all local government matters, that there was not a local authority of any kind whatever that was not then under its control, and that the Board was represented throughout the country by a large staff of general inspectors, travelling engineering inspectors, medical officers, and county and district auditors. The same authority calls attention to the ominous growth in the expenditure of the department,

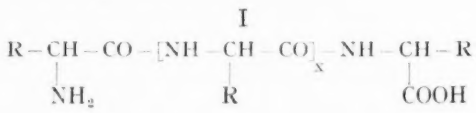
which had risen from £215,000 to £220,000. Since that day the same sort of work has been done, but it has been developed. Every function of the old Local Government Board is exercised by local authorities, by county councils, and by the Ministry itself. The country pays £1,643,000 for salaries in Whitehall to people who concern themselves with what is conveniently called policy, and local authorities pay many times as much to their officials in the localities who execute the policy. Any business concern, in the financial position of the nation to-day, would be under the painful necessity of intimating to its staff that it was impossible to consider increases of salaries. Not so, however, with the Ministry of Health. The sum of £92,600 has been added to the salaries of its officials since 1926.

## Russian Chemical Research

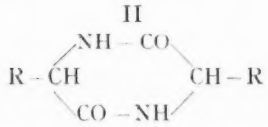
Of the 35 papers covering a total of 395 pages contained in Parts 7 and 8 of Vol. 58 of the *Journal of the Russian Chemical Society*, two communications by I. S. Jaitchnikoff (pp. 877–882) deserve special comment. They are of much general interest and will fundamentally alter our present views on protein chemistry.

Most chemists have been brought up in the belief that protein chemistry has been finally settled by the researches of Emil Fischer which have led him to assign to this group of organic substances the general formula I. About eight years ago the veteran Russian chemist N. D. Zelinsky showed that on careful hydrolysis of the protein derived from goose feathers nearly 80 per cent. of 1 : 4-diketopiperazines are obtained and not the corresponding amino acids, as was to be expected from Emil Fischer's general formula. Zelinsky therefore concluded that this protein is not a chain compound (compare formula I) but a mixture of ring compounds of the general formula II :—

I



II



Much opposition was shown to Zelinsky in Germany and in this country, and although Abderhalden, Emil Fischer's successor in this field of research, has in the main confirmed Zelinsky's results, it was believed that the proteins are built up on the Fischer principle, that the amino acids are formed on hydrolysis, and that the latter undergo anhydration and yield the corresponding 1 : 4-diketopiperazines. All these points have been most successfully cleared up by Jaitchnikoff, with the result that the Fischer formula now becomes obsolete. This will affect physiological research, especially the chemistry of digestion, and will enhance the restlessness in this field of research already so clearly shown in the lecture of Professor Sorensen before the Chemical Society in London on October 28, 1926.

### Books Received

The Atom. Benn's Sixpenny Library, No. 103. By Professor E. N. da C. Andrade. London: Ernest Benn, Ltd. Pp. 78. 6d.

Britain Looks Forward. By Sir Alfred Robbins. London: T. Fisher Unwin. Ltd. (Ernest Benn, Ltd.). Pp. 174. 6s.

The Road to Prosperity. By Sir George Paish. London: Ernest Benn, Ltd. Pp. 154. 6s.

The Philosophy of Individualism. A Bibliography. London: The Individualist Bookshop, Ltd. Pp. 94. Advance Proof, 1s.

The Oil and Colour Chemists' Handbook. By W. H. Hilton-Brown. London: The Trade Papers Publishing Co., Ltd. Pp. 176. 10s. 6d.

Textbook of Biological Chemistry. By James B. Sumner. London: Macmillan and Co., Ltd. Pp. 283. 15s.

An Investigation of the Coking Power of Coal. By J. T. Burdekin. Department of Scientific and Industrial Research. London: H.M. Stationery Office. Pp. 21. 1s.

## The Calendar

| Mar. | | |
|---|---|---|
| 19, 26 | Royal Institution: "The Alpha Rays and their Application to Atomic Structure." Sir Ernest Rutherford. 3 p.m. | Albemarle Street, London. |
| 21 | Sir John Cass Technical Institute: "Low Temperature Carbonisation." F. S. Sinnatt. 6 p.m. | Jewry Street, Aldgate, London. |
| 22 | Institution of Petroleum Technologists: Annual General Meeting. 5.30 p.m. | Royal Society of Arts, John Street, Adelphi, London. |
| 22 | Staffordshire Iron and Steel Institute, Birmingham Metallurgical Society and the Institute of Metals: "Nickel-Iron and Related Alloys." W. T. Griffiths. 7 p.m. | Engineers' Club, Waterloo Street, Birmingham. |
| 22 | Society of Chemical Industry (South Wales Section): Annual Meeting. 7 p.m. | Technical College, Cardiff. |
| 22 | Society of Chemical Industry (Birmingham Section): "The Removal and Recovery of Phenols from Ammonia Sulphate Still Effluents." D.W. Parkes. 7.15 p.m. | The University, Birmingham. |
| 24 | Institute of Chemistry and Society of Chemical Industry (Edinburgh Sections): "Fire Risks in Industry." A. M. Cameron. 8 p.m. | North British Station Hotel, Edinburgh. |
| 25 | Society of Chemical Industry and the Institute of Chemistry (Glasgow Sections): Annual Business Meeting. 7 p.m. | Messrs. Ferguson and Forrester's Restaurant, Glasgow. |
| 25 | Manchester Literary and Philosophical Society (Chemical Section). | 16, St. Mary's Parsonage, Manchester. |
| 24 | Chemical Society Annual General Meeting. Presidential Address: "Experiments on Molecular Complexity." Professor H. Brereton Baker. 4 p.m. | Burlington House, Piccadilly, London. |
| 25 | West Cumberland Society of Chemists and Engineers: Annual Meeting. 7 p.m. | Workington. |
| 25 | Society of Chemical Industry (Chemical Engineering Group): Joint meeting with the Institution of Mechanical Engineers. "Lubrication." Dr. W. R. Ormandy. 5.15 p.m. | Institution of Mechanical Engineers, Storey's Gate, St. James's Park, London. |
| 25 | Society of Chemical Industry, Institute of Chemistry (Newcastle Section) and the Newcastle Chemical Industry Club: Annual Dinner. 7.30 p.m. | Tilley's Restaurant, Blackett Street, Newcastle. |
| 26 | North of England Institute of Mining and Mechanical Engineers: "The Ventilation of a Pyrites Mine, with special reference to Fire-fighting, Safety and Rescue-work." R. White. 3 p.m. | Neville Hall, Newcastle-upon-Tyne. |
| 28 | Sir John Cass Technical Institute: "Liquid Fuel." Professor J. S. S. Brame. 6 p.m. | Jewry Street, Aldgate, London. |
| 29 | Hull Chemical and Engineering Society: "Works Filtration." Dr. R. B. Foster. 7.45 p.m. | Grey Street, Park Street, Hull. |
| 30 | Institute of Chemistry (Belfast Section): "Some Experiments on the Nutrition of Poultry." Professor G. Scott Robertson. | Royal Pelfast Academical Institution, Pelfast. |

# London Conference of Chemical Engineers

## The Discussions Reviewed: By Our Correspondent

THAT the Institution of Chemical Engineers is fast becoming an important body was evidenced by the interest that was taken in the several papers read at the conference held on Wednesday, Thursday, and Friday of last week, by the fact that several important chemical firms sent representatives who were commissioned to be in attendance at the several sessions, and by the distinguished gathering which assembled on the occasion of the annual dinner on Friday evening, when Sir Herbert Samuel was the principal guest.

The first two papers at the conference dealt with "Lead as a constructional material for chemical plant," and "The production of dissolved acetylene, and its application to lead burning," contributed respectively by Mr. S. T. Tungay, M.I.Chem.E., and Mr. W. C. Freeman.

### Views on Chemical Lead

Mr. Tungay's paper led to an interesting discussion. Reference was again made to the draft specification for chemical lead, primarily for sulphuric acid chambers and similar purposes, circulated privately about twelve months ago by the British Engineering Standards Association. The wisdom of adopting a specification where the lead content depends to an extent on the content of copper present was again questioned. It was remarked during the discussion by Mr. D. W. Jones and Mr. P. Parrish that it is a very difficult matter to ensure the homogeneous incorporation of copper with lead. Indeed, examinations of corroded lead had often revealed that the copper had been imperfectly distributed, and that this defect had been largely responsible for the failure. It was true that the introduction of copper increased the temperature at which the lead "flashed," and it was suggested that this was the reason why lead manufacturers preferred to incorporate copper with the lead.

Mr. Parrish, however, urged that the flash test, *per se*, was no criterion as to the suitability of a chemical lead. Other tests should be conducted—tests that had some relation to the conditions to which the lead would ultimately be subjected. Only in this way, and by the correlation of such tests, could a reasonably satisfactory indication be arrived at as to the suitability of the lead. Mr. Parrish suggested that the figures furnished by Mr. Tungay, concerning four different samples of sheet lead, exposed to the action of chamber gases for 130 days, completely bore out his contention. The Pattisonian lead (old sheet) showed a flash test of 300° C., against 314° C. with chemical lead prepared by the Parkes process. But the loss in grams per square inch was respectively 0·749 and 1·254. Thus the lead having the better flash test actually lost 67 per cent. more weight than the lead with the lower flash test.

### Importance of Purity

On the subject of chemical lead, Mr. D. W. Jones made it clear that purity was of vital importance; he agreed almost entirely with what had been affirmed by Mr. Parrish in his contribution on the "Corrosion of Lead," made at the corrosion symposium last July, and he furnished the following analysis as representing that of chemical lead which was now available for sale in large quantities:—

| | Per cent. |
|---|---|
| Copper | 0·0012 |
| Iron | 0·0006 |
| Silver | 0·0008 |
| Bismuth | 0·0024 |
| Zinc | 0·0005 |
| Antimony | 0·0001 |
| Tin, Arsenic, Cadmium, Nickel, Cobalt | Nil |
| Lead, by difference | 99·9940 |

Mr. Parrish remarked that the experience narrated by Mr. Tungay, concerning the failure of lead cracker pipes, made confusion worse confounded. It had to be remembered, in connection with the ammonia-steam distribution pipes of a saturator, that alkaline conditions existed inside, and acid conditions outside, the pipes. Moreover, the ammonium sulphate-acid magma invariably had associated with it tarry matter.

It must not be forgotten that cresols had a distinct action on chemical lead; that there were such bodies as basic plumbates, which were formed by the action of hot concentrated aqueous solutions of sodium carbonate or alkalis on lead. Knowing this, it was clear that many possibilities must be explored if the failure of cracker pipes was to be satisfactorily explained. Apart from chemical action, experience suggested that erosion was a prolific cause of the wear and tear of these pipes.

Mr. Jones (British Dyestuffs Corporation) asked if any information existed relating to the use of lead in connection with pressure and vacuum vessels, which had to be used under alternate acid and alkaline conditions, in the many stages of the process necessary in the preparation of vat dyes.

As regards homogeneous lead coating, it was pointed out that tinning the surface of the metal, and then soldering the lead sheet, served quite well for tank wagons which needed to be lead-lined, although whether this method was better than using a steel tank made of several double-flange pieces, which lent itself to lead-lining without the need for tinning and soldering was a matter about which there were two opinions. The spraying of metal surfaces with molten lead may be satisfactory for certain purposes, but one lost the advantage and effect of the solidarity of a good rolled sheet. The "Zeitler" method appeared cumbersome.

### An Interesting Demonstration

The practical demonstration of oxy-acetylene lead burning, and the oxy-acetylene blow pipe for flat lead burning, etc., was intensely interesting, and there can be no doubt that this method will find increasing application, especially where the geographical position of a chemical works does not admit of a ready and suitable supply of hydrogen or coal gas. The chief feature of the oxy-acetylene equipment was its compactness, and the ease with which it could be transported from one part of the works to another. Mr. Parrish questioned the statement of Mr. Freeman, that "the constituent elements of coal gas were such that it could not be accepted as a pure gas in its application to lead burning." "It was clear," he remarked, "that this dictum was obviously incorrect. Oxy-coal gas had been used in some of the largest works in London for at least two decades for the burning of chemical lead ranging from 6 lb. to 60 lb. per square foot, and it had given unqualified satisfaction."

Mr. Tungay, in a general reply, said that the discussion had undoubtedly proved interesting and helpful. He was not aware that any information had been collated on the subject referred to by Mr. Jones (B.D.C.). It would appear that it was essentially a matter for observation and research.

### Sulphuric Acid Manufacture

The two papers given at the evening session on Wednesday concerned plants the salient features of which were that they had been employed for several years in the intensive production of sulphuric acid. The papers in question were "A Note on the Function of the Schmiedel Box in the Manufacture of Sulphuric Acid," by Dr. Bush, M.Sc., and Mr. Arthur Grounds, B.Sc., A.I.C., and "Recent Developments in the Mills-Packard Chamber Plant," by Mr. W. G. Mills. A synopsis of these papers appeared in THE CHEMICAL AGE last week.

In the discussion on the two papers, Mr. Smy expressed doubt as to the wisdom of manufacturing sulphuric acid when expenditure on nitric acid was so heavy, representing, as it did, according to one example in the paper, approximately 35s. per ton of B.O.V. He suggested that the plant which Dr. Bush had shown diagrammatically was not a Schmiedel plant, but a hybrid one, consisting of the usual Glover and Gay Lussac towers, with Schmiedel boxes interspersed with tower chambers. He regretted that Mr. Mills had forestalled him in what he had intended to say about the satisfactory

results which followed the use of a Schmiedel box if it were succeeded by a Mills-Packard tower chamber.

Mr. P. Parrish congratulated Dr. Bush on the frankness which characterised his contribution. It was clear, from continued experience of the operation of the Schmiedel box, that its function was essentially that of a pretreater. It was particularly suitable in this connection for cold gases having a low $SO_2$ concentration. Indeed, it was a piece of plant as distinct from a process. It could not be doubted that the contributions of Dr. Bush and Mr. Mills had carried them a stage further in the development of a sound theory as to the underlying and fundamental principles which governed the intensive production of sulphuric acid. If, by further contributions of the character of the two papers in question, the Institution of Chemical Engineers could evolve a tenable theory in this connection, it was certain that it would have done much to justify its existence.

In analysing Mr. Mills's paper, particularly as regards the 1926 development, which it was suggested marked a "highly important epoch in the history of the Mills-Packard plant, owing to an installation of entirely new design," Mr. Parrish asked "What was the implication of the modification in design?" The new type of tower chamber had an appreciably larger diameter than the original ones, and the height was as great as that of the largest standard Mills-Packard tower chamber. "Was Mr. Mills aware that owing to the reduction of the velocity of the gases through the chamber, turbulence would be reduced, dissipation of the sensible heat and the heat of reaction would be less effective, and that the water-cooling would be less satisfactory?" Further, the surface area for cooling was being reduced in relation to the capacity. On the other hand, it was true that with a chamber of larger diameter and maximum height, a greater cubical capacity could be afforded at less capital expenditure, from the points of view of lead and steel. What was the implication to be drawn from this? Was one justified in assuming that Mr. Mills now attached more importance to an increased space-time factor, and less significance to the rapid dispersal of the sensible heat and the heat of reaction?

### The Liquid Phase Theory

The same speaker proceeded to enlarge on the liquid phase theory, as one of vital importance in the intensive production of sulphuric acid. The Gaillard system, it was pointed out, ensured five distinct features:—(1) It provided for intimate contact with nitrosyl sulphuric acid and the burner gases; (2) water could be introduced to the nitrosyl sulphuric acid, and thus water sprays could be dispensed with; (3) it ensured reaction space in both the liquid and the gaseous phases; (4) the supply of atomised acid admitted of the absorption of the exothermic heat of reaction in a peculiarly satisfactory way; and (5) it was an easy matter to cool the acid in an external cooler. Were not these features, all of which were combined in one chamber, the quintessence of intensive sulphuric acid production? Where nitrosyl sulphuric acid of varying nitrosities was to be employed, it was important that the lead should be protected with acid and heat-resisting tiles, so as to avoid wear and tear of the lead. But this provision could easily and inexpensively be arranged.

Dr. Bush had declared that reaction in the liquid phase, important though it was, was not enough. There must be an opportunity for reaction in the gaseous phase. Did not Mr. Mills's latest suggestion lead one to suppose that he was gradually but surely working towards the same objective?

Mr. MacNab referred to the liquid phase, particularly as regards experiments which had been conducted by Quinan. He was of opinion that had these experiments been consummated a piece of chemical plant would have been evolved which would have ensured intensive production of sulphuric acid.

Major Gloag spoke in commendatory terms of the contributions. Mr. Irwin and Mr. English affirmed that the function of water cooling in the case of Mills-Packard chambers was to keep the lead cool, and to prevent corrosive action. The temperature at the lead walls was only about 7° C. less than that at a point 9 in. inside the walls. Mr. English emphasised the fact that the lead of the Mills-Packard chambers was certainly preserved. Mr. Jones (B.D.C.) asked if the Schmiedel box could be recommended for the treatment of exit gases containing $SO_2$. Mr. Tungay raised the question of wear and tear of the lead of which the Schmiedel boxes were made, and suggested that the velocity of the acid over the surface of the lead was such that it would conceivably lead to corrosion.

### The Authors' Replies

Dr. Bush, in reply, said that despite Mr. Smy's observations, it was found profitable to work the plant. No one would continue to operate a number of Schmiedel boxes for the sake of operating them. They must have proved a commercial proposition, otherwise their operation would have been discontinued. Geographical position and isolation of the place were factors that must be contemplated in this connection. He emphasised the fact that he would not recommend the Schmiedel box for the treatment of exit gases. He assured the meeting that the wear and tear of the lead in the Schmiedel box was not excessive.

Mr. Mills said that at some future date he would be happy to furnish detailed particulars of the working of the new installation to which he had referred, and he would then endeavour to furnish the data about which Mr. Parrish had inquired. He confirmed what Mr. Irwin and Mr. English had said about water cooling—that the function of this was more to preserve the lead than to ensure rapid removal of the heat of reaction. It was true that the larger chamber developed in 1926 ensured greater cubical capacity at less expense than any of the standard chambers.

On Thursday the two papers which were contributed were "Rubber as a constructional material in chemical engineering," by Mr. B. D. Porritt, M.Sc., F.I.C., and "The effect of temperature on some properties of metals, with particular reference to the limiting creep stress," by Professor F. C. Lea, M.I.Chem.E. Both papers were of great interest. Indeed, the one by Professor Lea contained very valuable data which, Mr. Rogers said, at the meeting on Friday, "would have been of immense service to him, had they been available, when he was confronted with the design and preparation of the reaction chamber which forms part of the Cross cracking plant."

### Cross Cracking Process and Plant

The paper on Friday was one by Mr. F. Heron Rogers, M.I.Chem.E., M.I.Mech.E., on the subject of "The Cross Cracking process and plant." As was remarked by Sir Frederic Nathan, the paper was a very valuable contribution on a process which was becoming increasingly important.

Dr. Ormandy said that data relating to the creep stress of steels, both vanadium chrome steels and molybdenum chrome steels, had been determined some time ago, both in America and Germany, but not in this country. Research was needed in regard to the chemical constitution and behaviour of the cracked spirits. A good deal had been done in this country, but further information was required about those bodies which formed the unsaturated portion of cracked spirits. He was glad to observe that the Medway Oil Co. was about to undertake this work. No satisfactory analytical methods existed of determining unsaturated bodies in the presence of the aromatic ones.

Others who took part in the discussion were Mr. Dvorkowitsch, Mr. Nixon, Mr. Esling, Mr. Condrup, Professor Hinchley, and Mr. Parrish. They raised questions concerning the reaction chamber—whether it would not be desirable to provide this in three or four smaller units in future—the dephlegmator, the desirability of a by-pass connection between the suction and delivery pipes of the reaction chamber, and other chemical engineering aspects of the Cross cracking plant. Questions were asked about the refining losses, how much sulphuric acid, and of what strength, was used, and what was the smallest economic unit of Cross plant.

Mr. Rogers, in reply, said that he was aware of the work on creep stress which had been undertaken in Germany and elsewhere. Professor Lea's paper showed an extraordinary difference between 1·5 and 0·3 per cent. carbon steels. No work had, however, been done on 0·25 per cent. carbon steel, made in a basic hearth converter. In view of this, he regarded it as desirable that tests should be made. There was undoubtedly a great field for research on the aspects raised by Dr. Ormandy. The smallest economic unit was one capable of producing 2,000 barrels per day.

# Chemical Trade Returns for February

## Exports Still Down on Last Year: Slight Improvement on January

THE Board of Trade Returns for February show that imports of chemicals, drugs, dyes, and colours totalled £1,194,203, against £1,189,788 for the same period last year—a slight increase of £4,415 on February, 1926, and a decrease of £278,562 on January of this year. Exports are valued at £1,692,246, showing a decrease of £262,029 on February last year, but an increase of £59,381 on January of this year. Re-exports totalled £66,186, against £103,844 last year and £73,527 for January this year. The detailed figures are given below :—

### Imports

| | Quantities. 1926. | Quantities. 1927. | Value. 1926. £ | Value. 1927. £ |
|---|---|---|---|---|
| CHEMICAL MANUFACTURES AND PRODUCTS— | | | | |
| Acid Acetic ..... tons | 695 | 943 | 30,644 | 39,721 |
| Acid Tartaric ..... cwt. | 2,578 | 2,762 | 12,349 | 13,243 |
| Bleaching Materials ,, | 6,715 | 13,783 | 5,762 | 5,992 |
| Borax ..... ,, | 5,582 | 4,120 | 7,429 | 4,721 |
| Calcium Carbide ... ,, | 77,106 | 75,870 | 51,488 | 50,856 |
| Coal Tar Products, not elsewhere specified value | — | — | 62,829 | 68,130 |
| Glycerine, Crude ... cwt. | 447 | 3,494 | 1,233 | 13,963 |
| Glycerine, Distilled ,, | 298 | 174 | 1,179 | 772 |
| Red Lead and Orange Lead ..... cwt. | 3,787 | 5,997 | 7,804 | 10,394 |
| Nickel Oxide ..... ,, | 2,000 | 137 | 11,335 | 639 |
| Potassium Nitrate (Saltpetre) ..... cwt. | 6,309 | 10,789 | 8,123 | 12,306 |
| Other Potassium Compounds ..... cwt. | 353,474 | 433,726 | 84,766 | 91,284 |
| Sodium Nitrate ... ,, | 84,127 | 103,640 | 54,286 | 66,354 |
| Other Sodium Compounds ..... cwt. | 29,342 | 41,663 | 20,857 | 27,981 |
| Tartar, Cream of .. ,, | 5,137 | 4,992 | 19,071 | 18,023 |
| Zinc Oxide ..... tons | 1,151 | 610 | 40,553 | 21,399 |
| All other sorts ... value | — | — | 290,655 | 273,484 |
| DRUGS, MEDICINES, ETC.— | | | | |
| Quinine and Quinine Salts ..... oz. | 40,596 | 107,492 | 3,946 | 8,912 |
| Bark Cinchona ... cwt. | 2,328 | 1,177 | 11,156 | 5,456 |
| Other sorts ..... value | — | — | 118,530 | 103,824 |
| DYES AND DYESTUFFS, ETC.— | | | | |
| Intermediate Coal Tar Products ..... cwt. | — | 3 | — | 50 |
| Alizarine ..... cwt. | 164 | 98 | 7,776 | 5,369 |
| Other sorts ..... ,, | 2,542 | 3,075 | 52,512 | 89,097 |
| Cutch ..... ,, | 2,752 | 3,099 | 5,044 | 6,453 |
| Other dyeing extracts ,, | 1,042 | 2,382 | 3,994 | 6,842 |
| Indigo, Natural ... ,, | 87 | 98 | 2,480 | 2,599 |
| Extracts for Tanning cwt. | 111,717 | 102,885 | 105,815 | 109,439 |
| PAINTERS' COLOURS AND MATERIALS— | | | | |
| Barytes, Ground, and Blanc Fixe ..... cwt. | 71,944 | 48,931 | 17,105 | 12,696 |
| White Lead (dry) .. ,, | 10,510 | 11,894 | 21,408 | 21,074 |
| All other sorts .... ,, | 84,428 | 68,645 | 129,659 | 103,130 |
| Total of Chemicals, Drugs, Dyes, and Colours ..... value | — | — | 1,189,788 | 1,194,203 |

### Exports

| | | | | |
|---|---|---|---|---|
| CHEMICAL MANUFACTURES AND PRODUCTS— | | | | |
| Acid Sulphuric ... cwt. | 9,094 | 2,040 | 5,920 | 1,928 |
| Acid Tartaric ..... ,, | 693 | 1,413 | 3,854 | 7,559 |
| Ammonium Chloride (Muriate) ..... tons | 315 | 327 | 9,389 | 8,081 |
| Ammonium Sulphate— | | | | |
| To Spain and Canaries tons | 4,598 | 4,330 | 58,604 | 49,106 |
| Italy ..... ,, | 275 | 542 | 3,460 | 6,305 |
| Dutch East Indies tons | 4,237 | — | 54,392 | — |
| Japan ..... ,, | 4,949 | 1,343 | 51,762 | 15,705 |
| British West India Islands and British Guiana .. tons | 440 | 143 | 5,901 | 1,689 |
| Other Countries tons | 6,699 | 4,695 | 81,964 | 53,743 |
| Total .... ,, | 20,298 | 11,053 | 256,083 | 126,608 |

| | Quantities. 1926. | Quantities. 1927. | Value. 1926. £ | Value. 1927. £ |
|---|---|---|---|---|
| BLEACHING POWDER (Chloride of Lime) cwt. | 64,307 | 31,862 | 29,101 | 14,865 |
| COAL TAR PRODUCTS— | | | | |
| Anthracene ..... cwt. | 2,360 | — | 1,103 | — |
| Benzol and Toluol galls. | 18,565 | 317 | 2,687 | 44 |
| Carbolic Acid ..... cwt. | 13,064 | 8,641 | 20,307 | 16,089 |
| Naphtha ..... galls. | 15,684 | 5,285 | 1,485 | 509 |
| Naphthalene ..... cwt. | 1,770 | 483 | 1,198 | 478 |
| Tar Oil, Creosote Oil, etc. ..... galls. | 3,823,610 | 282,987 | 118,836 | 12,181 |
| Other Sorts ..... cwt. | 22,773 | 34,120 | 17,863 | 28,024 |
| Total .... value | — | — | 163,479 | 57,325 |
| Copper, Sulphate of .. tons | 4,606 | 6,083 | 98,538 | 136,390 |
| Disinfectants, etc. .... cwt. | 33,155 | 26,504 | 75,215 | 71,879 |
| Glycerine, Crude .... cwt. | 1,872 | 2,412 | 5,552 | 7,707 |
| Glycerine, Distilled ... ,, | 14,978 | 11,241 | 61,829 | 58,856 |
| Total .... ,, | 16,850 | 13,653 | 67,381 | 66,563 |
| Potassium Chromate and Bichromate ..... cwt. | 1,708 | 2,967 | 3,208 | 5,319 |
| Potassium Nitrate (Saltpetre) ..... cwt. | 927 | 1,626 | 1,869 | 3,153 |
| Other Potassium Compounds ..... cwt. | 1,612 | 3,319 | 10,636 | 12,237 |
| Total .... ,, | 4,247 | 7,912 | 15,713 | 20,709 |
| Sodium Carbonate .. cwt. | 377,760 | 520,396 | 113,461 | 154,978 |
| Soda Caustic ..... ,, | 154,620 | 192,312 | 108,815 | 139,306 |
| Sodium Chromate and Bichromate ..... cwt. | 3,558 | 1,792 | 5,354 | 2,372 |
| Sodium Sulphate .... ,, | 22,607 | 34,939 | 3,166 | 4,819 |
| Other Sodium Compounds ..... ,, | 51,912 | 33,558 | 70,065 | 34,153 |
| Total .... ,, | 610,457 | 782,997 | 300,861 | 335,628 |
| Zinc Oxide ..... tons | 75 | 49 | 3,352 | 2,166 |
| CHEMICAL MANUFACTURES, ETC., all other Sorts value | — | — | 247,788 | 236,965 |
| Total of Chemical Manufactures and Products (other than Drugs and Dyestuffs) ..... value | — | — | 1,276,674 | 1,086,666 |
| DRUGS, MEDICINES, ETC.— | | | | |
| Quinine and Quinine Salts ..... oz. | 117,776 | 144,116 | 15,433 | 13,943 |
| All other sorts ... value | — | — | 245,737 | 237,938 |
| Total .... ,, | — | — | 261,170 | 251,881 |
| DYES AND DYESTUFFS— | | | | |
| Products of Coal Tar cwt. | 12,998 | 4,655 | 78,872 | 41,523 |
| Other sorts ..... ,, | 6,391 | 5,127 | 8,210 | 5,940 |
| Total .... ,, | 19,389 | 9,782 | 87,082 | 47,463 |
| PAINTERS' COLOURS AND MATERIALS— | | | | |
| Barytes, Ground .. cwt. | 843 | 665 | 368 | 324 |
| White Lead (dry) .. ,, | 4,415 | 2,486 | 10,107 | 4,769 |
| Paints and Colours in Paste form ..... cwt. | 52,570 | 51,579 | 119,499 | 114,619 |
| Paints and Enamels Prepared ..... cwt. | 31,996 | 27,656 | 101,887 | 92,744 |
| All other sorts .... ,, | 48,568 | 43,291 | 97,488 | 93,780 |
| Total .... ,, | 138,392 | 125,677 | 329,349 | 306,236 |
| Total of Chemicals, Drugs, Dyes, and Colours value | — | — | 1,954,275 | 1,692,246 |

**Re-exports**

| | Quantities. | | Value. | |
|---|---|---|---|---|
| | 1926. | 1927. | 1926. | 1927. |
| CHEMICAL MANUFACTURES AND PRODUCTS— | | | £ | £ |
| Acid Tartaric .....cwt. | 110 | 77 | 719 | 476 |
| Borax..... ,, | 100 | 160 | 170 | 103 |
| Coal Tar Products value | — | — | 79 | 12 |
| Glycerine, Distilled cwt. | — | — | — | — |
| Potassium Nitrate ,, | 37 | 87 | 60 | 121 |
| Sodium Nitrate ... ,, | 1,560 | 1,082 | 1,036 | 692 |
| Tartar, Cream of .. ,, | 718 | 612 | 2,683 | 2,329 |
| All other sorts ...value | — | — | 27,341 | 13,931 |
| DRUGS, MEDICINES, ETC.— | | | | |
| Quinine and Quinine Salts .....oz. | 5,735 | 10,945 | 958 | 1,134 |
| Bark Cinchona ...cwt. | 204 | 89 | 1,136 | 384 |
| All other sorts ...value | — | — | 43,843 | 33,539 |
| DYES AND DYESTUFFS— | | | | |
| Cutch .....cwt. | 2,314 | 1,633 | 3,737 | 2,467 |
| Other Dyeing Extracts cwt. | 167 | 180 | 1,910 | 1,940 |
| Indigo, Natural ... ,, | — | 3 | — | 85 |
| Extracts for Tanning cwt. | 7,821 | 2,221 | 9,081 | 3,050 |
| PAINTERS' COLOURS AND MATERIALS .....cwt. | 1,550 | 1,108 | 6,336 | 4,749 |
| Total of Chemicals, Drugs, Dyes and Colours .....value | — | — | 103,844 | 66,186 |

# Chemistry and the Food Industry

## What it Does for Public Health

THE growing extent to which industries in this country, and indeed all over the world, are depending on the research work of chemists was emphasised by Mr. B. G. McLellan, of York, on Monday evening in a paper, "The Chemist and the Food Industry," which he read to the members of the Leeds section of the Institute of Chemistry.

Mr. McLellan pointed out that our food supplies are drawn from the animal, vegetable, and mineral kingdoms, and in all food production, treatment, preservation, packing, and storage, the mission of the chemist was of the first importance. Very few large industries concerned with the preparation or production of foodstuffs were now without a considerable staff of works chemists and thoroughly up-to-date laboratories. The Government had done much to enlighten men engaged in industry as to the importance of chemical research, and for different industries had subsidised no fewer than 24 Research associations, while in 1919 there was set up the British Association for Research into the cocoa, chocolate, sugar, confectionery, and jam industries. It had done great and valuable work in all these branches of the foodstuffs industry, along the lines of improving the products, eliminating the use of preservatives, determining the nature of proper factory appliances, processes, and temperatures, and preventing deterioration of products after leaving the factories. This Association was concerned with the investigation of all problems arising in manufacture, and concerning the properties of raw materials, etc., and the linking up of purely scientific research with technical practice.

### Important Research Work

Research work had already been of tremendous value to the jam-making industry in defining the best and most hygienic methods of manufacture conducive to the finished product retaining its wholesomeness in store, and also in ascertaining the relative jellying properties of fruits. Each year almost the manufacture of foodstuffs in this country increased, and with this increase there was gradually being introduced more stringent food laws, particularly as to purity of production, cleanliness of packing, and the eliminating of harmful preservatives. Thus the work of the analytical chemist was becoming greater both in its nature and scope. In view of the carrying on of research work on a national basis in any industry, it might be argued that the sphere of usefulness of the works chemist would disappear, but this was not in the least likely to happen. National research was helping British industrialists to compete with and beat their foreign rivals, but each individual works was concerned with the very practical problem of maintaining the standard of its own products, and holding its own with its competitors at home.

# A Standard Preservative Paint

## Paper before Oil and Colour Chemists

AT a meeting of the Oil and Colour Chemists' Association, on Thursday, March 10, in London, Dr. J. Newton Friend (past president) read a paper on "Recent research in the protection of steel with paint; a standard paint." Mr. C. A. Klein (the president) was in the chair.

Consideration of the replies to a questionnaire sent out in 1921 had confirmed his opinion, Dr. Friend stated, that a standard paint was required against which all preservative coatings for iron and steel could be tested under well-defined conditions. Such a paint would serve as a standard of reference, and enable them to express quantitatively, with numerical data, the relative efficiencies of different preservatives in the protection of iron from corrosion. Since 1921 it had been his endeavour to fix upon a standard paint that should be of use for this purpose, but many more years of patient research were necessary before the problem could be finally solved.

It was desirable that a standard paint should at least satisfy the following requirements:—(1) Contain the minimum number of ingredients consistent with efficiency; (2) be easily reproducible for many years to come; (3) be easy to make and capable of ready control, whether chemical or physical; (4) be reasonably inexpensive. Taking all things into consideration, it seemed probable that a paint conforming very closely to those requirements might be obtained by the incorporation of a single pigment with a pure linseed oil, without admixture with thinners, driers, or other ingredients. It was not essential that the paint should be a first-class protective medium, but it was essential that it should be reasonably good, and constant in properties.

### Pigments for Protective Paints

The two classes of pigment used most widely in paints for the protection of iron and steel were iron oxide pigments and those containing lead. Red lead was a synthetic product, the composition of which could be controlled with great nicety and reproduced in different batches with comparative ease. These facts, coupled with the favour with which it was widely regarded, indicated that a red lead of well-defined composition might prove a suitable pigment for the purpose in hand. Some of his experiments, however, indicated that in certain respects it was not altogether free from disadvantages as a constituent of standard paint. It was not entirely inert towards linseed oil. As the reaction between oil and pigment might vary with altering conditions and thus impair the constancy of the film's protective power, it seemed desirable to choose an absolutely inert pigment. In his experiments red lead had proved rather susceptible to attack by sea water when completely immersed for long periods. The red lead had tended to bleach, and, apart from interfering effects due to chemical change, there was the liability to physical disruption of the oil film due to change in density of the pigment. Finally, he had noticed a slightly greater tendency for pitting to occur in completely submerged specimens of steel coated with red lead paints than when protected with iron oxide paints. It was felt that anhydrous iron oxide pigments, which were highly inert towards linseed oil, sea water and any gases, vapours or sprays likely to occur in any atmosphere, might yield a more suitable pigment for the standard paint. Since most of the iron oxides on the market were originally of natural origin, their compositions were liable to vary within wide limits; nevertheless, to a certain extent they could be selected or controlled. Eleven typical iron oxide pigments were examined with a view to showing the influence exerted by variations in composition within certain well-defined limits upon the protective power of the paint. These pigments were made into paints by grinding with pure Calcutta raw linseed oil, and their efficiencies tested with mild steel plates. As a result, Dr. Friend suggested that in seeking a readily reproducible standard pigment, probably a chemically prepared 100 per cent. ferric oxide pigment would be found most constant in properties. Commercially, however, this was impracticable. Failing this, the higher the iron oxide content, the smaller would be the amounts, and hence the disturbing influence, of other substances.

# Commercial Synthetic Resins

## Achievements and Future Prospects

MR. H. W. ROWELL gave a lecture on "The Commercial Synthetic Resins, and their Products" at a meeting of the Birmingham and Midland Section of the Society of Chemical Industry, on Tuesday, March 8.

By combination of suitable resin with suitable reinforcing and filling materials, he said, it was possible to make goods which did not soften on heating or decompose at temperatures below 350° C., did not swell or distort when boiled in water, were not attacked by tar, petroleum or vegetable oils, alcohol, or the common organic solvents, 50 per cent. sulphuric, strong hydrochloric, hydrofluoric or organic acids, zinc chloride, copper sulphate, and most salt solutions. Strong sodium carbonate and weak caustic solutions were without effect, but the resins were soluble in strong caustic solutions and were charred or oxidised by strong sulphuric and nitric acids. The term "synthetic resin" was a misnomer, for those compounds had no chemical relation to the natural resins and a few physical properties in common with them, but they continued to use the term until a better generic name was discovered.

### Synthetic Resins a Chemical Industry

The manufacture of synthetic resins had become a chemical industry of such commercial importance that the volume of its demand for raw materials affected their market price. One firm in America was working a large synthetic carbolic plant to supply part of its requirements of pure phenol. At least 30 well qualified chemists were directly engaged in controlling plant and sales or in research connected with the manufacture of synthetic resins in this country, and probably over 300 chemists, together with a number of assistants, were so exclusively engaged throughout the world. A resin might be prepared by heating under a reflux condenser one molecular equivalent of crystal carbolic acid with one molecular equivalent of 40 per cent. formaldehyde solution. After several hours the condensation was complete and the mixture separated into an upper watery layer and a lower resinous layer. Acids, alkalis and salts which acted as electrolytes, catalysts or condensing agents might be added to the mixture. They considerably shortened the time of reaction and might produce resins having different practical use or final properties. Paraformaldehyde, hexamethylenetetramine, and other substances producing formaldehyde and catalysts might be used, while creosols sometimes replaced phenol. In these cases the characteristics of the intermediate and final resins might differ considerably. In practice, synthetic resins were actually made from synthetic phenol and synthetic formaldehyde, thus making the product truly synthetic.

The "treacle," "primary" or "A" resin thus produced was separated from the watery layer and dried by heating under vacuum. It was a sticky, viscous mass, either clear or translucent, soluble in alcohol and acetone but not in benzene or petrol. If this "treacle" was further heated under controlled conditions, it polymerised to the "resin" or "B" stage, when it had the appearance of common resin, melted to an extremely viscous mass at temperatures below 80° C., and was still soluble in alcohol and acetone. The "final," "baked" or "C" stage was produced by still further heating and polymerisation, when it became insoluble in alcohol and acetone and did not soften when heated. The "treacle" and "resin" were intermediate stages which made possible the commercial production of the final and only useful stage having the shapes, colours, and general properties desired. The "final" state of the various phenol-aldehyde resins might exhibit some difference in the matter of hardness, softening with heat or solvents, and other physical properties, but, generally speaking, they did not soften on heating, were not decomposed at temperatures lower than 350° C., were insoluble in all the usual organic solvents, acids, alkalis, and chemical solutions, except concentrated nitric and sulphuric acids and caustic solutions. Strong caustic soda would dissolve them and they might be reprecipitated on the addition of acid.

When creosols were used to replace phenol the resulting final product was generally softer and more flexible. Ortho-cresol alone combined more slowly with formaldehyde and by incomplete combination produced this softness and flexibility. When mixed cresols were used together with phenol, the reaction was even more difficult to follow, but technical observation of the properties of the variety of resin-like bodies it was possible to make from phenol and formaldehyde led to the conclusion that a number of reactions went on side by side. The speed of reaction was controlled by temperature, catalyst, and the proportion of free formaldehyde present, and this determined the proportion of the various compounds or polymers which formed the final mixture.

### Still Scope for Research

In conclusion, Mr. Rowell said that the original search for synthetic varnish resins had resulted so far only in the modified phenol-aldehyde type called Albertols, the coumarone resins, and an insignificant supply of shellac substitutes of various composition and special application. The production of these resins compared with consumption of the natural resins was quite small, and there was room for the discovery of something more satisfactory for varnish manufacture. The sidelines of research often resulted in discovery of more importance than the main object and the commercial development of the phenol-aldehyde resins had now provided new materials and methods of production and new industries of considerable importance. Over 90 per cent. of the synthetic resin manufactured was of the phenol-aldehyde type, and new application, modification, and increased output was frequently registered. Any successful competitive resin must show either cheaper material, more convenient application, cheaper method of manufacturing its products, greater resistance to heat or other destructive agents, or more pleasing appearance. Except for the light colour of the thio-carbamide resins, no competition was in sight. There was still a demand for a new synthetic material which would provide electrical insulation, whose electrical strength was invariable under varying temperature, which was not damaged by an electric arc, which was easily worked and had all the other desirable properties demanded by the electrical engineer, and also for a transparent, colourless, synthetic material which would remove the danger of plate-glass windows on vehicles in a really satisfactory manner.

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# Taxes on Transport

*To the Editor of* THE CHEMICAL AGE.

SIR,—May I ask space in THE CHEMICAL AGE to suggest that the present is no time for further additions to charges on transport. No less a sum than £10,000,000 has been added to those charges for this year, as to £3,000,000 by new taxes upon motor transport, and as to £7,000,000 by the increased railway rates, which came into force in February last. These amounts, to which certain additions are inevitable in the course of passing on between buyers and sellers, are already proving of adverse effect upon trade, industry, and employment. Taxation strangles trade. Members of Parliament should have impressed upon them the consternation of all business men who hear rumours of still further disturbances of the kind. The trade of the country wants a rest in these matters, particularly at a time when it is so necessary for our export trade to be regained.—I am, etc.,

E. S. SHRAPNELL-SMITH,
President,
Commercial Motor Users Association (Incorporated).
50, Pall Mall, S.W.1.

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### Food and Drugs Bill

THE Sale of Food and Drugs Bill passed through Standing Committee A of the House of Commons on Tuesday, and as amended was ordered to be reported to the House. The object of the Bill is to give effect to a recommendation of the Departmental Committee on the use of preservatives and colouring matter. The Committee recommended that any prohibitions or limitations imposed by the regulations should bind the courts in proceedings taken under the Sale of Food and Drugs Acts. Some drafting amendments in the name of Sir Kinglsey Wood, Parliamentary Secretary to the Ministry of Health, were adopted. The Minister congratulated Mr. Jacob as the member responsible for the first bill to get through Standing Committee this session.

# Cellulose Ester Varnishes

## Their Effect on the Paint Industry

DR. STANLEY SMITH, in a lecture on "Cellulose Ester Varnishes," at a meeting of the Manchester Section of the Oil and Colour Chemists' Association last week, said the subject of his paper was the nitro-cellulose lacquers and varnishes, known also as pyroxylin lacquers, cellulose ester lacquers, and chemical finishes. It was practically certain that these beautiful technical products would displace paint and varnish as we knew them to-day to an ever-growing extent, but it was quite another thing to forecast, as Sir Frank Heath did a few months ago before an Australian audience, that the old-established paint and varnish industry was going to be swept away during the next decade. In his (Dr. Smith's) opinion, both the old and the new industries would exist side by side, neither doing very material damage to the other, and there was certainly no immediate danger of any sudden or violent upheaval, calculated to destroy the economy of the older colour industry. On the other hand, they must recognise that these new lacquers had come to stay and were being daily improved.

### Growth of the Industry

If they were not already acquainted with the statistics of the new lacquer industry, they would probably be astonished at the rapidity of its growth. The quantity of "cotton" lacquer—as the Americans called it—made in this country to-day was no doubt only a drop in the ocean compared with ordinary paint. In 1924, there was an output of only about 25,000 gallons. In 1926, more than three times that quantity was being produced, and he had seen a forecast for 1929 estimating the production to be no less than 200,000 gallons. A more accurate measure of the potentialities of this industry was furnished by the experience of makers in the United States. In America in 1921 there were 17 factories making cotton lacquer, with a total production of some 1,500,000 gallons, or something like eighteen times our own production to-day. By 1923 the number of factories rose to 41, with an estimated production of 3,250,000 gallons, whilst the latest figures available revealed the fact that in 1925 America had no less than 85 factories turning out cotton lacquers and producing between them about 11,000,000 gallons of various lacquers and varnishes based on the nitrate of cellulose. If this industry showed anything like a proportionate growth in this country, it meant that many men would be required to conduct its manufacturing operations and to superintend its processes.

The two industries, the old and the new, had not much in common from the technical point of view, but the fact remained, Dr. Smith said, that the colour trade should control the lacquer industry as much as possible by controlling the production of these new goods, because it already had the business and sales organisation capable of handling the situation. Practically all the varnish makers in the United States were now making cellulose lacquers, and probably in due time the British houses would be similarly employed. As the work of the research chemist progressed, they would find that the pyroxylin products would be sold under the same guarantees as the oil and resin products were to-day.

The art of pigmentation of the cotton lacquers still demanded considerable research. Possibly some means of homogenisation would eventually be adopted, and they might look forward to far less trouble from deposition problems than was at present the case. He had done some experimental work in that direction and had obtained results that confirmed his feelings of optimism.

The next important point was plant and machinery, which stood as much in need of standardisation as most of the other details concerned with this new industry. Probably the ideal plant could be founded on the Fraser patents for varnish making. That arrangement implied that in no stage of manufacture was the lacquer exposed to the air, so that volatilisation of the solvents was completely obviated and no dust or dirt could enter the vessels at any time.

### Brush Lacquers

Dr. Smith, in conclusion, said the advent of a brush lacquer on the British market had aroused a certain amount of curiosity, but it was probable that some time would elapse before this type emerged from the non-industrial stage. There did not appear to be any particular economy in this type, as it eliminated the great advantage of the spray lacquers, namely, the fact that the latter could be applied in a very thin film and in the minimum of time. Trading in brush lacquers presented numerous difficulties, especially with regard to the deposition of the pigment, but there was no inherent difficulty in making up a brush lacquer. Most of the best types of spray lacquer could be applied with a brush, and the alteration in design was easily calculated, although it was, perhaps, too expensive to allow for these brush lacquers being an economic proposition at the present time.

# Plant Chemistry

## Recent Work on Photosynthesis

A MEETING of the Manchester Section of the Institute of Chemistry was held on Monday, March 7, at which Mr. S. E. Melling presided. Professor E. C. C. Baly, F.R.S., delivered a lecture entitled "Plant Chemistry."

Professor Baly said that probably the one reaction in chemistry which was more interesting than any others was the one by means of which a living plant succeeded in converting carbonic acid or carbon dioxide and water into carbohydrates, including, of course, the simultaneous reactions whereby materials of the nature of proteins and similar substances were produced. The reaction was interesting because it was the fundamental reaction at the basis of all life. In 1921 Professor Heilbron, Professor Barker, and himself, stated Professor Baly, published a preliminary paper in which they claimed to have obtained ordinary formaldehyde by the action of light upon carbon dioxide in water. This claim was considered, somewhat hastily perhaps, by many people as a distinct contribution to the subject of the photosynthesis which took place in the leaves of plants. The pioneers in this particular experimental field were Professor Moore and Mr. Webster, who had investigated the possibilities of the conversion of carbonic acid into formaldehyde. They found that when solutions of carbonic acid and water were exposed to ultra-violet light, nothing happened; that was to say, they were unable to detect the formation of formaldehyde, but they did find that in the presence of colloidal ferric hydroxide, small quantities of formaldehyde were produced.

### Formation of Carbohydrates

Professor Baly said that he and his fellow workers differed somewhat from that conclusion because they found that if water through which a stream of carbonic acid was passed was exposed to ultra violet light that afterwards there was very definite evidence of the formation of ordinary formaldehyde. Moore and Webster showed that formaldehyde, on exposure to ultra violet light, was converted into substances which showed some of the reactions of ordinary hexose sugars. Consequently, said Professor Baly, there had been put forward the idea that formation of carbohydrates in the living leaf took place in two stages, the first stage being the formation of ordinary formaldehyde, and the second stage being the subsequent conversion of the formaldehyde, by polymerisation under the action of light, into sugar. As a matter of fact, when this proposition was examined from the physico-chemical point of view, it was found to be erroneous. According to the modern views of chemistry, every single reaction required that the reactant molecules must be activated by the supply of a certain amount of energy before they underwent any reaction whatsoever. The great mystery of the living leaf was the fact that in spite of our knowledge a very large number of gram-calories had to be absorbed to bring about the reaction, yet the plant managed to effect it by means of visible light, and indeed, as far as one could ascertain, by light which lay within the yellow region of the spectrum. There was a photo-chemical reaction on the surface of the leaf, and it was believed that the large total quantity of energy necessary to activate the carbonic acid was supplied at the surface, and then the process was completed by visible light. Photosynthesis took place in the cells which were known as chloroplasts. There was strong evidence that the phenomenon of photo-synthesis of the plant was surface absorption on a limited portion of the surface. There was also a fatigue effect to be considered. If the light was too strong the plant ceased to work, though it became active again after being placed in the dark for a couple of hours. With too much light, the functioning power of the chlorophyll was arrested.

# Indian Chemical Notes

(From Our Indian Correspondent.)

The silver jubilee of the Bengal Chemical and Pharmaceutical Works was celebrated at Calcutta in the fourth week of January. The idea of manufacturing drugs and chemicals on a small scale from indigenous materials was first conceived by Sir P. C. Ray. These works were then started by him on a small scale and have now developed to their present large dimensions, employing 1,200 men and worked by electric power. The principal lines of manufacture are chemicals, pharmaceutical preparations and scientific instruments. The company also makes disinfectants, surgical dressings, laboratory furniture, gas generators, fire extinguishers, and several other kinds of mechanical appliances. A great variety of medicinal products from indigenous drugs are also manufactured and are usually in wide demand.

### Cinchona Products

The area under cinchona in Bengal at the end of 1925-26 was 3,153 acres, showing an increase of 93 acres over the previous year. The quantity of bark harvested was 539,000 lb., as against 432,000 lb. in the previous year. The full outturn could not be utilised in the Bengal Government factory owing to a large stock of Java bark. There is considerable difficulty in securing suitable soil for further extension of the plantations. The total quantity of bark treated during the year was about one million lb. and the quantity of factory produce sold was 42,500 lb. The sale rates of quinine sulphate and other quinine salts were considerably reduced during the year, and in spite of that there was a profit on the whole of about Rs. 2 lakhs.

### Test House Investigations

The Government Test House at Alipore, Calcutta, is carrying out a number of investigations in addition to testing stores and purchase. Investigations of the weathering and protective properties and composition of various paints and allied substances on the market, and also of experimental paints made up in the Test House laboratory, have been carried out and the results published. Under the Oil Section, extended investigations into the physical and chemical properties of all the reputable lubricating oils marketed in India and in use by the various State services have been initiated with a view to enlarging the available knowledge regarding the properties of the various grades of oils sold by the large oil manufacturing companies.

### The Protection of Steel

The Tariff Board has now submitted its report on the steel industry, wherein it recommends the discontinuance of the bounty and the continuance of the protection by tariffs only. The tariff should take the form of a basic duty which in most cases represents a reduction on the present tariff and an additional duty on steel of non-British origin. The Board considers that the bounty system has served its purpose, and that the industry can exist, if properly managed, under the protection of the tariffs proposed. Prices have now stabilised to such an extent that the Board feel justified in granting protection for a period of seven years, during which it is expected that the company would be able to establish itself firmly. A notable feature of the Board's recommendation is the proposed differential duty, under which a higher duty will be placed on continental steel than on the British product, which has attained a standard of excellence which is peculiarly its own.

### Electric Steel

Among the various projects propounded by the State to develop its mineral industries is one for the manufacture of electric steel. The details of this scheme have already been worked out and the matter has now gone up for financial sanction by Government. Another mineral product is Mysore white lead, which is now produced through a Syndicate, and has established its reputation in the country. The product is largely requisitioned by Indian railways and other concerns. The further development of this industry, however, is said to be impeded by the excessive railway freights ordinarily charged for the transport of supplies.

The factory for the manufacture of reinforced concrete in the State, worked by the Government, has been considerably expanded.

# Chemical Matters in Parliament

### Safeguarding of Industries: Lactic Acid

Major Crawfurd (House of Commons, March 8) asked the President of the Board of Trade why his Department was persistently referring applicants under Section 10 (5) of the Finance Act, 1926, for orders exempting key industry products from liability to duty under Part I of the Safeguarding of Industries Act, 1921, on the grounds that they were not made in any part of His Majesty's Dominions in quantities which were substantial, having regard to the consumption of the articles for the time being in the United Kingdom, to certain chemical manufacturers in this country who were not in a position to offer the products in question of their own manufacture; and was he aware that lactic acid B.P. was an example of the action complained of?

Sir P. Cunliffe-Lister answered that before an article could be exempted from duty under Section 10 (5) of the Finance Act, 1926, the Board must be satisfied not only that the article was not being made in His Majesty's Dominions, but also that there was no reasonable probability that it would be so made within a reasonable period. As regards the particular product mentioned in the question, applicants were given the name of a manufacturer who proposed to produce it in the near future, and was setting up the necessary plant for the purpose. The prospect of production of lactic acid in this particular case was drawing rapidly nearer because the firm had ordered the plant and the whole of the first consignment of the plant for the earlier process had been delivered and set up as one of the results of the Act.

### Beet Sugar Companies

Mr. T. Wilson (House of Commons, March 14) asked the Minister of Agriculture which beet sugar companies in receipt of subsidy have issued shares to the public.

Mr. Guinness said the shares in the following beet sugar factories controlled by companies in receipt of subsidy had either been issued or were available to the public: Kelham, Ely, Ipswich, Greenock, Peterborough, Wissington, and Kidderminster.

### Chemicals in Flour

Rear-Admiral Beamish (House of Commons, March 14) asked the Minister of Health whether he proposed, by legislation or otherwise, to carry into effect the recommendations, or any of them, of the Departmental Committee on the treatment of flour with chemical substances?

Sir K. Wood said the report of the Departmental Committee was at present under consideration. No statement could be made at the moment as to the action to be taken on their recommendations.

Mr. Lumley asked if the report of the Committee had been published and Sir K. Wood replied that it had.

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### Commercial Travellers' Club

Although commercial travellers have been late in entering the sphere of club life, Saturday, March 19, at 3 p.m., will see the opening to members of a fine British Commercial Travellers' Club in London at 24/28, New Oxford Street, and Sir Ernest Benn, who has accepted office as president of the Club, will hold a presidential reception on Monday, April 25, at which many principals of leading commercial firms will be present. The Club premises comprise four spacious floors over Barclay's Bank, British Museum Branch, and will contain a restaurant, lounge, buffet, billiard room, writing rooms, committee rooms, and rooms for business appointments where travellers and buyers may meet. Membership will be open to all commercial travellers "and such other persons as may be approved by the Committee," and doubtless the new Club will follow the example of the Overseas C.T. Clubs, and welcome into membership a sprinkling of business colleagues who are not, strictly speaking, commercial travellers. The Club is immediately opposite the West Central District Post Office. Telephone, telegraphic address, postal address and the amenities of a West End club are offered at the modest subscription of one guinea per year. A postcard to the Secretary (Mr. C. J. Kebbell, 24–28, New Oxford Street, W.C.1) will secure an application form to any of our readers interested.

# From Week to Week

THE COUNCIL OF THE BRITISH ASSOCIATION has nominated Sir William Bragg as President of the Association for the meeting in Glasgow in 1928.

SIR HUGH BELL will be the principal guest at the annual dinner of the Society of Dyers and Colourists to be held in Bradford on Friday, March 25.

SIR ALFRED MOND, M.P., has promised to preside at the seventy-ninth anniversary festival of the Royal Metal Trades Pensions and Benevolent Society in October.

MR. WILLIAM MACCONNACHIE delivered an address on "Alkalis in the Blast Furnace" to the members of the West of Scotland Iron and Steel Institute in the Royal Technical College, Glasgow, on Friday, March 11.

IT IS REPORTED that the Leuna Works, near Halle, Germany, which are affiliated to the Dye Trust, propose to begin the production of synthetic oil from lignite on April 1 in small quantities. Production will be increased later when the market is able to consume a larger output.

THE INSTITUTE OF CHEMISTRY has appointed the following additional honorary corresponding secretaries: R. Boyd, British Columbia; W. Francis, British Guiana; J. Gray, South Africa; Professor M. Parker, Manitoba; and Professor D. H. Peacock, Burma and Rangoon.

IN THE HOUSE OF COMMONS on Monday, during some debate on scientific research, Dr. G. C. Clayton, M.P., stated that from what he knew of the work of the Fuel Research Station he believed that the time was approaching when oil could be produced from coal at a reasonable cost.

THE FIRST COURSE of the series of Gow Lectures on the "Colloid Chemistry of the Rubber Industry" will be given under the auspices of the University of London by Dr. E. A. Hauser, of Frankfort-on-Main, at University College, London (Gower Street, W.C.1), during the first fortnight in May next. Full particulars of these lectures will be published later.

UNIVERSITY NEWS.—Dr. P. W. Clutterbuck, of Leeds, has been appointed Assistant Lecturer in Physiological Chemistry in the University of Manchester.—The honorary degree of M.Sc. is to be conferred on Mr. Hugh Dunford Smith, Secretary of the Newcastle Section of the Society of Chemical Industry, at the June Convocations at Durham University.

A PRESENTATION is to be made at the Manchester College of Technology to Mr. John Allan by the Evening Students' Chemical Society, in appreciation of his services. Mr. Allan has been forced by business appointments to resign his position of lecturer in the College, after thirty-five years. He received a presentation a few weeks ago from the students of the particular class with which he has been most closely associated.

SIR ERNEST BENN is to be the speaker at the fifth of the series of luncheons arranged under the auspices of the Individualist Bookshop, Ltd., to further the cause of individualism. The luncheon will be held at the Hotel Cecil on Wednesday, March 23, at 12.45 p.m., and the chair will be taken by Sir William Plender. Tickets are obtainable, price 5s., from the Individualist Bookshop, Ltd., 40, Marsham Street, Westminster.

A FACTORY FOR SYNTHETIC METHYL ALCOHOL is being built at Lens, France, where an output of 1½ tons daily is hoped for this year. The process to be used was developed by M. Audibert, and apparently resembles that previously worked out by Professor Franz Fischer in Germany. M. Audibert is also working on the production of hydrocarbons direct from producer gas. The French Government is also investigating the commercial production of alcohol from vegetable products, commissions having been sent to Algeria and to the African Colonies to study this branch of work.

THE SECOND EXPERIMENTAL REPORT to the Atmospheric Corrosion Research Committee of the British Non-Ferrous Metals Research Association, by Dr. W. H. J. Vernon, will be read before the Faraday Society, in the rooms of the Chemical Society, Burlington House, Piccadilly, London, on Wednesday, March 30, 1927, at 3 p.m. The president, Professor C. H. Desch, F.R.S., will occupy the chair, and the presentation of the report will be followed by a general discussion. Advance proofs may be obtained from the secretary, 90, Great Russell Street, before the meeting, for which a charge of 2s. 6d. will be made to non-members.

SOUTH WALES PATENT FUEL MANUFACTURERS, who are now engaged in an intensive campaign to place the industry upon a sound footing, are seeking foreign sources of pitch supplies owing to the high price of the British product. The Crown Preserved Coal Co., Ltd., Cardiff, are already receiving supplies from Baltimore, U.S.A., and it is possible that other Welsh fuel makers may shortly be receiving supplies from the same source. The increasing activity of the South Wales industry may be gathered from the fact that 100,000 tons of patent fuel will be shipped to the River Plate from Cardiff and Swansea between May and December on a basis of 15s. 6d. per ton.

SIR JOHN BRUNNER has gone abroad for about four weeks, and no letters, we understand, will be forwarded.

THE NEWCASTLE BENZOL CO. has completed an installation at the South Docks, Sunderland. The installation consists of storage tanks with a total capacity of three million gallons.

THE INFORMAL CONFERENCES which recently took place between British and German industrialists are likely to be renewed in May, when Dr. Duisberg, of the Bayer Colour and Chemical Works at Leverkusen, intends to invite his British confrères to an informal discussion at Cologne.

THE NATIONAL FERTILISER ASSOCIATION of America, at a meeting on January 10 at Washington, agreed to accept a code of trade practices which had been drawn up in consultation with the Department of Justice. Altogether a total of 196 companies have agreed to carry on business in accordance with the code.

A CELOTEX FACTORY, it is expected, will be established in Australia within the next 15 months. Plans are being made by Mr. H. C. Armstrong, of Australia, who is interested in the celotex industry. Celotex, which is made from the refuse of sugar cane, has been imported from America for demonstration purposes.

THE FINAL INDIAN INDIGO CROP FORECAST for season 1926-27, for the area comprising Madras, Behar and Orissa, United Provinces, Punjab, Bombay, Sind, and Bengal (about 85 per cent. of the total indigo area of India), estimated at 100,400 acres (75 per cent. of 1925-26), is 20,100 cwt. (71 per cent. of 1925-26).

AT STROUD COUNTY COURT on Tuesday, Judge Alan Macpherson recorded agreements for the payment of lump sums of £800 and £750 respectively as compensation to two Stroud men suffering from manganese poisoning, contracted whilst at work for S. G. Bailey and Co., paint and varnish manufacturers, of Stafford's Mills, near Stroud.

THE MINISTRY OF MINES under its Welfare Scheme has made a grant to Armstrong College, Newcastle, to provide laboratory facilities and plant for the closer study of mining. There is a mining society in connection with the College, and between it and the North of England Institute of Mining and Mechanical Engineers there is likely to be a strong bond of common interest.

THE CENSUS OF PRODUCTION (1924) is now in process of publication. *The Board of Trade Journal* is giving a series of preliminary reports on the subject. Last week's issue (March 10) contains, among others, reports on the sugar and glucose, and the spirit distilling, rectifying, compounding, and methylating trades. In the next issue the coal mining, coke, and by-products industry will receive attention.

RECENT WILLS INCLUDE: Mr. David Stark Honeyman, of Kirkcaldy, founder of D. S. Honeyman and Sons, bleachers, £17,340.—Mr. James Arthur Butler, of Birstall, and of T. E. Butler, Son and Co., manufacturing chemists (net personalty £2,088), £19,990.—Mr. Joseph Taylor, of Huddersfield, well known as a chemist and dye expert, director of the United Indigo and Chemical Co., Ltd. (net personalty £714), £1,081.—Sir Ellis Griffith, of London and Anglesey, lately a director of Mond Nickel Co., Ltd. (net personalty £5,547), £10,884.

THE CHEMICAL SOCIETY'S annual general meeting will be held at Burlington House, London, on Thursday, March 24, at 4 p.m., when the presidential address, entitled "Experiments on Molecular Complexity," will be delivered by Professor H. Brereton Baker. The Longstaff Medal for 1927 will be presented to Professor Robert Robinson, and the Harrison Memorial Prize for 1926 will be presented to Dr. Charles R. Harington. The anniversary dinner will be held the same evening in the King Edward VIII Rooms, Hotel Victoria, Northumberland Avenue, London, at 7 for 7.30 p.m. Among the distinguished guests present will be the presidents of the French, German, and Italian Chemical Societies.

APPLICATIONS ARE INVITED for the following appointments: A Lecturer in the Chemical and Metallurgical Department of Wolverhampton and Staffordshire Technical College, North Street, Wolverhampton. Burnham (Technical) Scale. The Clerk to the Governors. March 25.—A Director of Research into the Prevention of Water Pollution and Cognate Problems. £1,200. The Secretary, Department of Scientific and Industrial Research, 16, Old Queen Street, London, S.W.1. March 31.—A Laboratory Assistant (with experience in a bacteriological laboratory), at the Chemical Research Laboratory, Teddington. Up to £3 per week. The Secretary, Department of Scientific and Industrial Research, 16, Old Queen Street, S.W.1. March 21.

### Obituary

MR. FREDERICK GEORGE SKELTON, of Bradford. From 1870 until his retirement in 1919 he was engaged in a soap-making business at Crossley Hall, Bradford.

MR. CHARLES ADOLPHUS SWAINE, of Huddersfield, aged 78. He was principal of the firm of W. P. England and Co., drysalters and chemical merchants, of Huddersfield, until last year.

DR. ROBERT ROWE PEARSE, at Plymouth, in his 63rd year. Until ill-health necessitated his return to England, Dr. Pearse was managing director of the Burma Chemical Industries, Ltd., a concern which he founded.

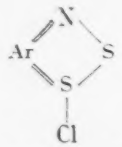
# Patent Literature

*The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each.*

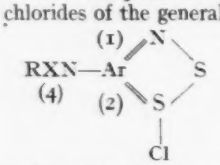
## Abstracts of Complete Specifications

265,641. INTERMEDIATE PRODUCTS AND DYES. A. J. Ransford, 24, Southampton Buildings, London, W.C.2, from L. Cassella and Co., G.m.b.H., Frankfort-on-Main, Germany. Application date, August 7, 1925.

In Specification 17417/14 is described the action of disulphur dichloride on aromatic amines with production of compounds now stated to be arylenethiazthionium compounds of the formula:



Such of these products as contain a labile substituent such as halogen or alkoxy in the aromatic nucleus (Ar) in the *p*-position to the nitrogen atom can be condensed with primary or secondary aromatic amino compounds to give 4-arylamino-2 : 1-thiazthionium chlorides of the general formula:



Where R and Ar are aryl residues and x an alkyl or aralkyl group. These compounds are now found to be convertible into 4-arylamino-1-aminoaryl-2-mercaptans by treatment with alkalies with or without a reducing agent. The products have all the properties of *o*-aminoarylmercaptans and yield, for example, alkyl and aralkylthioethers which can be used for the production of azo dyestuffs; they also yield with chloracetic acid 4-arylamino-1-amino-2-arylthioglycollic acids which can be used for making azo and thioindigo dyestuffs: especially valuable dyes, probably thiazines, are produced by condensing them with arylquinones and these dye wool from the hydrosulphite vat in blue to black shades. The thiazines yield by sulphurising products which dye cotton from the vat or sulphide bath in similar shades. For condensing with the quinones the *o*-aminoarylmercaptans may be replaced by the corresponding *o*-amino-aryl-thiosulphonic acids or disulphides. Examples are given of the production of *o*-aminoarylmercaptans by reducing the condensation products from 6-methyl-4-chlor-2 : 1-phenylene-thiazthioniumchloride (from *o*-toluidine and disulphur dichloride) and aniline, benzidine, or *o*- or *m*-amino-benzoic acid, from 6-methoxy-4-chlor-2 : 1-phenylenethiazthioniumchloride and aniline, and from 4-chlor-1 : 2-naphthylenethiazthioniumchloride and aniline; they are then condensed with quinones such as chloranil, 2 : 5- and 2 : 6-dichlorquinones, β-oxy-α-naphthoquinone and 2 : 3-dichlor-α-naphthoquinone; the same dyestuffs may also be obtained by passing air through a solution containing the arylamino-*o*-aminoarylmercaptan, a hydroquinone, and a suitable catalyser. The dyes from the carboxyphenylamino-*o*-aminoarylmercaptans are soluble and can be used for dyeing and printing in the manner commonly used for acid and chrome dyestuffs.

265,672. ELECTROLYTIC OXIDATION OF ORGANIC COMPOUNDS. C. H. Field, 4, Albert Road, Brockley, London, S.E.4. Application date, November 7, 1925.

The electrolytic oxidation of organic compounds is effected in the presence of a catalyst prepared from cerite ore from Sweden by boiling with concentrated sulphuric acid, stirring with water and decanting and precipitating a red body from the clear solution by adding caustic soda or oxalic acid. The red body is stated to contain a rare earth element similar to didymium but not identical therewith. Details are given for the oxidation of anthracene to anthraquinone in sulphuric acid to which has been added 5 per cent. of the red body. Lead electrodes are used, the negative being separated from the positive by an asbestos or earthenware diaphragm and the anolyte being kept in a state of vigorous agitation. Toluene, *m*-xylene, and naphthalene can be similarly oxidised, the first mentioned yielding benzaldehyde.

265,677. SYNTHETIC PLASTIC AND RESINOUS MATERIALS. L. Bourgoin, 975, Sherbrooke Street East, Montreal, Canada. Application date, November 9, 1925. Samples furnished.

Animal or vegetable fatty substances or a mixture of fatty acids and glycerine, are converted into plastic or resinous materials by treatment with calcium carbide and steam under pressure so that the fat, etc., combines with the nascent acetylene produced. As an alternative, the water may be introduced as a salt with water of crystallisation which is mixed with the fat, etc., and carbide and the mixture heated. A number of other variations of the process are mentioned. The products are plastic when hot and may in this state be readily moulded; they are insoluble in water, alcohol, and acetone, but dissolve in carbon tetrachloride, carbon disulphide, and ether.

265,767. DYES. W. Carpmael, 24, Southampton Buildings, London, W.C.2, from I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, January 30, 1926.

Monoazo dyes, which dye wool from an acid bath without a mordant and also dye cellulose acetates and ethers, are produced by coupling (*a*) a diazotised aminobenzyl-ω-sulphonic acid of the formula $NH_2.C_6H_4.CH_2.SO_3H$ with an aromatic amine not containing a sulphonic or carboxylic group, or (*b*) a diazotised nitrated aminobenzyl-ω-sulphonic acid with a 2-naphthylamine sulphonic or carboxylic acid, or a 2-amino-oxynaphthalene or a sulphonic acid thereof; the derivatives of the above aminobenzyl-sulphonic acids may also be used. A large number of examples are given, the diazo components specified being 2-aminobenzyl-ω-sulphonic acid and its 5-nitro- and 3 : 5-dinitro-derivatives, and 4-aminobenzyl-ω-sulphonic acid and its 5- nitro-and 3 : 5 dinitro-derivatives; the coupling components mentioned are diphenylamine, methyldiphenylamine, methyl- or ethyl-benzylaniline, 2-naphthylamine, ethyl- or oxyethyl-2-naphthylamine, 2-amino-8-naphthol-6-sulphonic acid and its methyl- and phenyl-derivatives, 2-naphthylamine-6-sulphonic acid and its phenyl-derivative. The products dye wool and cellulose acetates and ethers in a wide range of shades varying from yellow and red to blue and violet.

265,777. AURO-MERCAPTO ACIDS AND SALTS. W. Carpmael, 24, Southampton Buildings, London, W.C.2, from Chemische Fabrik auf Actien vorm. E. Schering, Mullerstrasse 170/171, Berlin, Germany.

Auro mercapto acids can be obtained by the action of auric salts on organic mercapto acids, but a part of the expensive mercapto compound is used in reducing the auric salts to aurous salts and leads to formation of by-products. It is now observed that the mercapto compound can be completely converted into the gold compound if the reaction with the auric salt is effected in the presence of sulphur dioxide or an acid or neutral sulphite, the latter serving as reducing agents. Examples are given according to which the gold compounds of the following bodies are prepared, using potassium auribromide in presence of sulphur dioxide or sodium bisulphite solution: mercaptoglycerinsulphonate, *p*-mercaptobenzene-sulphonate, and 4-amino-2-mercaptobenzene-1-carboxylic acid.

265,857. SULPHURIC ACID. R. Gallardo y de Sotto, Ventura Rodriguez 21, Madrid, Spain. Application date, July 20, 1926.

According to this specification, the sulphur dioxide containing gases to be used for the production of sulphuric acid, either by the contact or by the chamber process, are subjected to the action of alpha-, beta-, and gamma-rays from radium while at

a temperature of 900-1200° C. The gases may be simultaneously treated with ultra violet light from a mercury vapour lamp. The gases, prior to entering the acid plant, are passed through a quartz tube provided with electrical heating device, in the centre of which is mounted a tube containing the radium compound; a portion of the tube is made of transparent quartz to permit the entrance of ultra violet light from the external lamp. It is stated that the yields of sulphuric acid are increased by about 30 per cent. over those obtained in the usual method of production.

265,880. METAL SALTS.—A. F. Meyerhofer, Göthestrasse 10, Zurich, Switzerland. Application date, May 28, 1926. Patent of Addition to 245,719.

According to Specification 245,719 the double decomposition of two salts is effected through the intermediary of a silicofluoride or borofluoride; thus sodium nitrate is produced from calcium nitrate and sodium chloride according to the following cyclic scheme:

$$Na_2SiF_6 \text{ (heated)} = 2NaF + SiF_4$$
$$2NaF + Ca(NO_3)_2 = 2NaNO_3 + CaF_2$$
$$CaF_2 + SiF_4 + 2NaCl = Na_2SiF_6 + CaCl_2$$

According to the modification now proposed the fluoride formed according to the second equation is not converted directly into the original silicofluoride but first into another silicofluoride, say that of zinc. The latter is then reconverted into the initial silicofluoride by double decomposition. The method permits the use of a silicofluoride, say barium silicofluoride, readily decomposed by heat, while still rendering possible the production of the desired compound.

NOTE.—Abstracts of the following specifications, which are now accepted, appeared in THE CHEMICAL AGE when they became open to inspection under the International Convention: 242,986 (Metallbank und Metallurgische Ges. Akt.-Ges.), relating to the reactivation of adsorption media, see Vol. XIV, p. 83; 244,107 (Deutsche Erdol Akt-Ges.), relating to the conversion of heavy into light hydrocarbons, see Vol. XIV, p. 161; 254,674 (F. Wilhelm), relating to the working up of acid resins into neutral bitumens, see Vol. XV, p. 256; 255,428 (De Bataafsche Petroleum Maatschappij and J. H. C. de Brey), relating to the separation of mixtures of volatile hydrocarbons, see Vol. XV, p. 307; 255,886 (Roessler and Haaslacher Chemical Co.), relating to the production of amide acid sulphates, see Vol. XV, p. 332.

## International Specifications not yet Accepted

263,873. WETTING AND EMULSIFYING AGENTS. Chemische Fabrik Pott and Co., 39, Priessnitzstrasse, Dresden, Germany. International Convention date, December 31, 1925.

Aromatic hydrocarbons or their derivatives are condensed with olefines or their derivatives in presence of a condensing agent under such conditions that liberation of water is substantially avoided. The hydrocarbons specified are naphthalene, anthracene, phenanthrene, and acenaphthene and various derivatives thereof; as olefines may be used aliphatic olefines containing three or more carbon atoms and cyclic compounds such as di- and tetra-hydrobenzene. The condensation is preferably effected with sulphonic acids of the aromatic hydrocarbons and sulphuric acid in such amount and at such low temperature that the formation of alcohol from the olefine is avoided; the reaction is also advantageously effected in presence of oxidising agents such as air, peroxides, per-salts, or chromic acid. The products, particularly in the form of sulphonic acids, may be used as emulsifying agents and to assist the wetting of textile and other materials.

263,879. DYES. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, January 2, 1926.

Substituted aryl-di-*o*-cresotinic acid carbinols are treated with normal sulphites whereby water soluble chrome dyestuffs are obtained. Those products which do not contain an amino group in the *p*-position to the methane carbon atom dye wool in blue or greenish shades changed to brown by after-chroming. A number of examples are given.

264,124. GLYCOLS. Carbide and Carbon Chemicals Corporation, 30, East 42nd Street, New York, U.S.A. International Convention date, January 7, 1926.

These are prepared by heating chlorhydrins with caustic alkali under pressure with or without sodium chloride. The production of ethylene glycol from ethylenechlorhydrin is described.

264,143. HYDROXY-ACID ESTERS. Canadian Electro Products Co., Ltd., 83, Craig Street West, Montreal, Canada. International Convention date, January 11, 1926.

These are produced by treating cyanhydrins of ketones or aldehydes with alcohols in the presence of an equimolecular quantity of water, and sufficient mineral acid to combine with the ammonia liberated. The preparation of the following esters is described: ethyl lactate from acetaldehyde cyanhydrin, furfurylglycollic acid ester from furfuraldehyde cyanhydrin, α-hydroxy-*n*-valeric ester from butyraldehyde cyanhydrin, α-hydroxy-isobutyric ester from acetone cyanhydrin, and mandelic ester from benzaldehyde cyanhydrin. In each case the theoretical quantity of water is used together with ethyl-alcoholic hydrogen chloride solution in slight excess. The products are substantially anhydrous.

264,181. CELLULOSE ACETATES. Soc. Lyonnaise de Soie Artificielle, 20, Rue Lafont, Lyons, and P.A.A. Chavalet, Lux, Cote d'Or, France. International Convention date, January 11, 1926.

In order that cellulose may be rendered active and readily convertible into cellulose acetates yielding viscous solutions, it is subjected to treatment with formic acid in the cold. The acid may be used as 100 per cent. acid, or as a weaker acid together with sulphuric acid or anhydrous zinc chloride. When cellulose has been so treated, washed, and dried, it can be acetylated in the presence of only traces of sulphuric acid.

LATEST NOTIFICATIONS.

267,071. Process of refining mineral oils with liquid sulphur dioxide. Allgemeine Ges. für Chemische Industrie. March 5, 1926.

267,095. Method and apparatus for low-temperature distillation of coal. International Combustion Engineering Corporation. March 4, 1926.

267,121. Manufacture of new intermediate products and new vat dyestuffs derived from perylene diketones. Compagnie Nationale de Matières Colorantes et Manufactures de Produits Chimiques du Nord Reunies Etablissements Kuhlmann. March 5, 1926.

267,132. Manufacture and production of side-chain aromatic compounds or their sulphonic acids. I. G. Farbenindustrie Akt.-Ges. March 3, 1926.

267,133. Photographic objectives. I. G. Farbenindustrie Akt.-Ges. March 4, 1926.

267,138. Process and apparatus for the hot desulphurisation of gases derived from the distillation or the pyrogenation of solid, liquid, or other combustibles. Soc. Internationale des Procédés Prudhomme-Houdry. March 4, 1926.

267,154. Production of fine fuel dust. I. G. Farbenindustrie Akt.-Ges. March 8, 1926.

267,155. Manufacture and production of valuable organic compounds. I. G. Farbenindustrie Akt.-Ges. March 8, 1926.

267,162. Manufacture of dyestuffs. Soc. of Chemical Industry in Basle. March 8, 1926.

267,163. Manufacture of ortho-amino-aldehydes and ortho-amino-ketones of the anthraquinone series. I. G. Farbenindustrie Akt.-Ges. March 8, 1926.

267,164. Manufacture of ortho-amino-carboxylic acids of the anthraquinone series and substitution products thereof. I. G. Farbenindustrie Akt.-Ges. March 8, 1926.

267,165. Manufacture and production of organic compounds. I. G. Farbenindustrie Akt.-Ges. March 8, 1926.

## Specifications Accepted with Date of Application

238,904. Condensation products of urea or its derivatives and formaldehyde, Manufacture of. F. Pollak. August 25, 1924.

243,353. Producing iron and other carbon-binding metals and alloys directly from iron oxide, Method for. H. G. Flodin and E. G. T. Gustafsson. November 19, 1924.

246,840. New Alanines of the Anthraquinone series, Manufacture of. I.G. Farbenindustrie Akt.-Ges. January 31, 1925.

247,956. Purification of condensation products produced from phenols and aldehydes, Process for. Bakelite Ges. February 17, 1925.

250,947. Highly viscous lubricating oils, Process for the manufacture of. G. Schicht Akt.-Ges. April 14, 1925.

251,969. Motor fuel, Manufacture and production of. I. G. Farbenindustrie Akt.-Ges. May 28, 1925.

259,223. Antiseptic and disinfectant. P. L. V. Jamotte. October 1, 1925.

263,732. Separation of the constituents of gaseous mixtures by liquefaction, Processes for. Soc. L'Air Liquide, Soc. Anon. pour l'Etude et l'Exploitation des Procédés G. Claude. December 24, 1925.

266,225. Treatment of natural aluminium hydroxides, Process for. F. Kleinemann and Buttner-Werke Akt.-Ges. August 25, 1925.
266,396. Continuously separating a gaseous mixture, Process for. H. Wade. (*Naamlooze Venootschap Philips' Gloeilampenfabrieken.*) September 23, 1925.
266,397. Sulphuric acid, Manufacture of. J. V. Skoglund. September 23, 1925.
266,404. Vat dyestuffs. Cassella and Co., A. J. Ransford, and A. Carpmael. October 14, 1925.
266,405. Organic compounds containing oxygen, Manufacture and production of. J. Y. Johnson. (*Badische Anilin und Soda Fabrik.*) October 19, 1925.
266,410. Methanol and other oxygenated organic compounds, Manufacture and production of. J. Y. Johnson. (*Badische Anilin und Soda Fabrik.*) October 23, 1925.
266,414 and 266,415. Citric acid, Production of. A. Fernbach, J. L. Yuill, and Rowntree and Co., Ltd. October 26, 1925.
266,418. Rubber, Manufacture of. P. Schridrowitz and Vultex, Ltd. October 28, 1925.
266,437. Apparatus for making anhydrous metal chlorides. F. T. Wohlers. November 23, 1925.
266,533. Diazotisable azo dyestuffs and intermediate products therefor, Manufacture of. Chemical Works vorm. Sandoz, and M. Böniger. February 19, 1926.
266,539. New halogen substituted oxindol-3-acetic acids, Manufacture of. W. Carpmael. (Chemische Fabrik auf Actien vorm. E. Schering.) February 27, 1926.
266,561. Azo dyes. British Dyestuffs Corporation, Ltd., K. H. Saunders, and H. Goodwin. April 17, 1926.
266,584. Distillation of solid fuel in coke ovens. C. Still. June 15, 1926.
266,615. Filtering apparatus. Powley and Sons, Ltd., R. and M. Powley. August 28, 1926.
266,658. Manufacture of metals and alloys in the electric furnace. D. Croese. August 27, 1925.

### Applications for Patents

Appareils et Evaporateurs Kestner. Recovery of caustic soda from residual lyes. 6,711. March 10. (France, March 12, 1926.)
Canadian Electro Products Co., Ltd. Cellulose derivatives. 6,539. March 9. (United States, May 4, 1926.)
Canadian Electro Products Co., Ltd. Manufacture of benzoic acid esters. 6,540. March 9. (United States, May 4, 1926.)
Carpmael, W. (I. G. Farbenindustrie Akt.-Ges.). Manufacture of vat dyestuffs. 6,723. March 10.
Carpmael, W. (I. G. Farbenindustrie Akt.-Ges.). Nitration of dianthrone, etc. 6,891. March 11.
Carpmael, W. (I. G. Farbenindustrie Akt.-Ges.). Manufacture of triphenyl methane dyestuffs. 6,892. March 11.
Carpmael, W. (I. G. Farbenindustrie Akt.-Ges.). Manufacture of dyestuffs from indoline bases. 6,893. March 11.
Chemische Fabrik auf Actien, vorm. E. Schering. Manufacture of alkaloid salts of camphoric acid. 6,722. March 10. (Germany, April 15, 1926.)
Coles, S. O. Cowper-. Reduction of zinc oxide. 6,764. March 11.
Curtin, L. P. Wood preservatives. 6,365. March 7.
Graesser-Monsanto Chemical Works, Ltd., and Mather, E. Treatment of tar oils, etc. 6,383. March 8.
Heller, O. Apparatus for low-temperature distillation. 6,809. March 11. (Germany, April 1, 1926.)
I. G. Farbenindustrie Akt.-Ges., and Imray, O. Y. Manufacture of dyestuffs. 6,311. March 7.
I. G. Farbenindustrie Akt.-Ges., and Johnson, J. Y. Production of hydrocarbons. 6,701. March 10.
I. G. Farbenindustrie Akt.-Ges., and Imray O. Y. Manufacture of coloured solutions of nitro-cellulose. 6,706. March 10.
I. G. Farbenindustrie Akt. Ges. Manufacture of vat dyestuffs. 6,723. March 10.
I. G. Farbenindustrie Akt.-Ges., and Johnson, J. Y. Production of stable suspensions of coal. 6,843. March 11.
I. G. Farbenindustrie Akt.-Ges. Nitration of dianthrone, etc. 6,891. March 11.
I. G. Farbenindustrie Akt.-Ges. Manufacture of triphenyl methane dyestuffs. 6,892. March 11.
I. G. Farbenindustrie Akt.-Ges. Manufacture of dyestuffs from indoline bases. 6,893. March 11.
I. G. Farbenindustrie Akt.-Ges. Production of fine fuel dust. 6,304. March 7. (Germany, March 8, 1926.)
I. G. Farbenindustrie Akt.-Ges. Production of organic compounds. 6,305. March 7. (Germany, March 8, 1926.)
I. G. Farbenindustrie Akt.-Ges. Production of vat dyestuffs. 6,306. March 7. (Germany, June 22, 1926.)
I. G. Farbenindustrie Akt.-Ges. Production of vat dyestuffs. 6,307. March 7. (Germany, July 1, 1926.)
I. G. Farbenindustrie Akt.-Ges. Production of benzanthrone derivatives. 6,308. March 7. (Germany, August 10, 1926.)
I. G. Farbenindustrie Akt.-Ges. Manufacture of ortho-aminoaldehydes, etc. 6,449. March 8. (Germany, March 8, 1926.)
I. G. Farbenindustrie Akt.-Ges. Manufacture of ortho-aminocarboxylic acids, etc. 6,450. March 8. (Germany, March 8, 1926.)
I. G. Farbenindustrie Akt.-Ges. Manufacture of organic compounds. 6,452. March 8. (Germany, March 8, 1926.)
I. G. Farbenindustrie Akt.-Ges. Production of emulsions. 6,699 March 10. (Germany, March 10, 1926.)
I. G. Farbenindustrie Akt.-Ges. Production of hydrogen. 6,700. March 10. (Germany, March 10, 1926.)
I. G. Farbenindustrie Akt.-Ges. Decomposing titanium ores. 6,842. March 11. (Germany, March 11, 1926.)
I. G. Farbenindustrie Akt.-Ges. Production of catalysts. 6,965. March 12. (Germany, March 13, 1926.)
Kyber, W. Simultaneous manufacture of iron phosphide and fused cement. 6,477. March 8. (Germany, March 10, 1926.)
Loon, J. van. Manufacture of activating-carbons, etc. 6,702. March 10.
Plassmann, J. Low-temperature distillation of fuels. 6,596. March 9.
Pollak, F. Manufacture of condensation products. 6,970. March 12.
Rees, R. L. Colorimeter. 6,820. March 11.
Robins, W. Non-inflammable films. 6,812. March 11.
Soc. Internationale des Procédés Prudhomme-Houdry. Manufacture of synthetic liquid fuels. 6,409. March 8. (France, March 9, 1926.)
Soc. of Chemical Industry in Basle. Manufacture of dyestuffs. 6,448. March 8. (Switzerland, March 8, 1926.)
Synthetic Ammonia and Nitrates, Ltd. Production of coke in briquette form. 6,832. March 11.
United Water Softeners, Ltd. Apparatus for purifying water, etc. 6,898. March 11.
Wagner, J. Producing ironoxidehydrate from iron. 6,406. March 8.

## Motor Fuels: Present and Future

### The Boot Foundation Lecture

PROFESSOR F. S. KIPPING, F.R.S., gave the fifth annual Jesse Boot Lecture on Friday, March 11, at University College, Nottingham, on Motor Fuels: Present and Future. The lecturer outlined the fermentation processes involved in the production of alcohol from sugar and starch-containing materials. Alcohol was a very valuable motor fuel but too expensive to use alone. The world's annual production of alcohol was said to be 450,000,000 galls., but of this about 370,000,000 galls. are contained in alcoholic beverages, leaving only 80,000,000 galls. for industrial purposes. Of this a large proportion was required in the making of ether, tinctures, perfumes, dyes, essences, etc., and very little was left for use as a motor fuel. Alcohol from starch could no doubt be obtained in immensely larger quantities than at present, but the production of alcohol as a motor fuel from sugar or starch was economically impossible. The lecturer dealt in detail with the various sources of motor fuel and with certain synthetic processes. He concluded by briefly discussing the possibilities which lay in the conversion of the enormous supplies of cellulose (much of it waste material) into alcohol, either direct by the aid of some organism still to be discovered or by previous conversion of the cellulose into sugar and then fermenting the sugar.

### University Men in Chemical Industry

SIR ALFRED MOND, M.P., addressing the Oxford Luncheon Club, described the change which during his lifetime had come over the relations of the universities and commerce. "As far as modern industry is concerned," he said, "we would not think of engaging an engineer or chemist who had not obtained first-class university honours." The rate at which university men developed enabled them to be placed in positions of great responsibility at an earlier age than would be the case if they had not received a university education. The university man was more wanted and appreciated to-day because he had not had the old training, which consisted of people going into an office when they were boys and passing through years of unnecessary drudgery. Industry wanted men of wide knowledge, wide culture, and logically trained minds with a knowledge of men and the world and a large outlook, and he mentioned that he had introduced a distinguished member of Oxford University to take charge of the research development of one of his businesses. It would certainly be the most important department of its kind in this country, and perhaps in the world.

# Weekly Prices of British Chemical Products

*The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.*

## General Heavy Chemicals

ACID ACETIC, 40% TECH.—£19 per ton.

ACID BORIC, COMMERCIAL.—Crystal, £34 per ton; powder, £36 per ton.

ACID HYDROCHLORIC.—3s. 9d. to 6s. per carboy d/d, according to purity, strength, and locality.

ACID NITRIC, 80° Tw.—£21 10s. to £27 per ton, makers' works, according to district and quality.

ACID SULPHURIC.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations: 140° Tw., Crude Acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.

AMMONIA ALKALI.—£6 15s. per ton f.o.r. Special terms for contracts.

BISULPHITE OF LIME.—£7 10s. per ton, packages extra, returnable.

BLEACHING POWDER.—Spot, £9 10s. per ton d/d; Contract, £8 10s. per ton d/d, 4-ton lots.

BORAX, COMMERCIAL.—Crystals, £19 10s. to £20 per ton; granulated, £19 per ton; powder, £21 per ton. (Packed in 2-cwt. bags, carriage paid any station in Great Britain.)

CALCIUM CHLORIDE (SOLID).—£5 12s. 6d. to £5 17s. 6d. per ton d/d carr. paid.

COPPER SULPHATE.—£25 to £25 10s. per ton.

METHYLATED SPIRIT 61 O.P.—Industrial, 2s. 5d. to 2s. 10d. per gall.; pyridinised industrial, 2s. 7d. to 3s. per gall.; mineralised, 3s. 6d. to 3s. 10d. per gall.; 64 O.P., 1d. extra in all cases; prices according to quantity.

NICKEL SULPHATE.—£38 per ton d/d.

NICKEL AMMONIA SULPHATE.—£38 per ton d/d.

POTASH CAUSTIC.—£30 to £33 per ton.

POTASSIUM BICHROMATE.—4½d. per lb.

POTASSIUM CHLORATE.—3¾d. per lb., ex wharf, London, in cwt. kegs.

SALAMMONIAC.—£45 to £50 per ton d/d. Chloride of ammonia, £37 to £45 per ton, carr. paid.

SALT CAKE.—£3 15s. to £4 per ton d/d. In bulk.

SODA CAUSTIC, SOLID.—Spot lots delivered, £15 2s. 6d. to £18 per ton, according to strength; 20s. less for contracts.

SODA CRYSTALS.—£5 to £5 5s. per ton, ex railway depots or ports.

SODIUM ACETATE 97/98%.—£21 per ton.

SODIUM BICARBONATE.—£10 10s. per ton, carr. paid.

SODIUM BICHROMATE.—3½d. per lb.

SODIUM BISULPHITE POWDER, 60/62%.—£17 per ton for home market, 1-cwt. drums included.

SODIUM CHLORATE.—2¾d. per lb.

SODIUM NITRITE, 100% BASIS.—£27 per ton d/d.

SODIUM PHOSPHATE.—£14 per ton, f.o.r. London, casks free.

SODIUM SULPHATE (GLAUBER SALTS).—£3 12s. 6d. per ton.

SODIUM SULPHIDE CONC. SOLID, 60/65.—£13 5s. per ton d/d. Contract, £13. Carr. paid.

SODIUM SULPHIDE CRYSTALS.—Spot, £8 12s. 6d. per ton d/d. Contract, £8 10s. Carr. paid.

SODIUM SULPHITE, PEA CRYSTALS.—£14 per ton f.o.r. London, 1-cwt. kegs included.

## Coal Tar Products

ACID CARBOLIC CRYSTALS.—6d. per lb. Crude 60's, 1s. 8d. to 1s. 9½d. per gall.

ACID CRESYLIC 99/100.—2s. 3d. to 2s. 4d. per gall. Steady. 97/99.—2s. to 2s. 1d. per gall. Pale, 95%, 1s. 10d. to 2s. per gall. Dark, 1s. 9d. to 1s. 10d. per gall.

ANTHRACENE.—A quality, 2½d. to 3d. per unit. 40%, 3d. per unit.

ANTHRACENE OIL, STRAINED.—8d. to 8½d. per gall. Unstrained, 7½d. to 8d. per gall.; both according to gravity.

BENZOLE.—Crude 65's, 1s. 2½d. to 1s. 3½d. per gall., ex works in tank wagons. Standard Motor, 1s. 9d. to 2s. 4d. per gall., ex works in tank wagons. Pure, 2s. 2d. to 2s. 5d. per gall., ex works in tank wagons.

TOLUOLE.—90%, 1s. 11½d. to 2s. 3d. per gall. Firm. Pure, 2s. 3d. to 2s. 5½d. per gall.

XYLOL.—2s. 2d. to 2s. 6d. per gall. Pure, 4s. per gall.

CREOSOTE.—Cresylic, 20/24%, 10½d. per gall. Standard specification, 6¾d. to 9d.; middle oil, 7½d. to 8d. per gall. Heavy, 8½d. to 9d. per gall. Salty, 7d. per gall. less 1¼%.

NAPHTHA.—Crude, 9½d. to 1s. 0½d. per gall. according to quality. Solvent 90/160, 1s. 8d. to 2s. 1d. per gall. Solvent 95/160, 1s. 9d. to 1s. 10d. per gall. Solvent 90/190, 1s. 3½d. to 1s. 4d. per gall.

NAPHTHALENE CRUDE.—Drained Creosote Salts, £8 per ton. Whizzed or hot pressed, £8 10s. to £9 per ton.

NAPHTHALENE.—Crystals, £11 10s. to £12 10s. per ton. Quiet. Flaked, £12 10s. per ton, according to districts.

PITCH.—Medium soft, 87s. 6d. to 105s. per ton, according to district; 79s. to 79s. 6d. per ton March-April shipment.

PYRIDINE.—90/140, 9s. 6d. to 13s. per gall. Nominal. 90/180, 7s. 6d. per gall. Heavy, 5s. to 8s. per gall.

## Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated:

ACID AMIDONAPHTHOL DISULPHO (1-8-2-4).—10s. 9d. per lb.

ACID ANTHRANILIC.—6s. per lb. 100%.

ACID BENZOIC.—1s. 9d. per lb.

ACID GAMMA.—8s. per lb.

ACID H.—3s. 3d. per lb. 100% basis d/d.

ACID NAPHTHIONIC.—1s. 6d. per lb. 100% basis d/d.

ACID NEVILLE AND WINTHER.—4s. 9d. per lb. 100% basis d/d.

ACID SULPHANILIC.—9d. per lb. 100% basis d/d.

ANILINE OIL.—7d. per lb. naked at works.

ANILINE SALTS.—7d. per lb. naked at works.

BENZALDEHYDE.—2s. 3d. per lb.

BENZIDINE BASE.—3s. 3d. per lb. 100% basis d/d.

BENZOIC ACID.—1s. 8½d. per lb.

*o*-CRESOL 29/31° C.—4d. per lb.

*m*-CRESOL 98/100%.—2s. 8¾d. per lb.

*p*-CRESOL 32/34° C.—2s. 8¾d. per lb.

DICHLORANILINE.—2s. 3d. per lb.

DIMETHYLANILINE.—2s. per lb. d/d. Drums extra.

DINITROBENZENE.—9d. per lb. naked at works. £75 per ton.

DINITROCHLORBENZENE.—£84 per ton d/d.

DINITROTOLUENE.—48/50° C. 8d. per lb. naked at works. 66/68° C. 9d. per lb. naked at works.

DIPHENYLAMINE.—2s. 10d. per lb. d/d.

*a*-NAPHTHOL.—2s. per lb. d/d.

*B*-NAPHTHOL.—11d. to 1s. per lb. d/d.

*a*-NAPHTHYLAMINE.—1s. 3d. per lb. d/d.

*B*-NAPHTHYLAMINE.—3s. per lb. d/d.

*o*-NITRANILINE.—5s. 9d. per lb.

*m*-NITRANILINE.—3s. per lb. d/d.

*p*-NITRANILINE.—1s. 9d. per lb. d/d.

NITROBENZENE.—6d. per lb. naked at works.

NITRONAPHTHALENE.—1s. 3d. per lb. d/d.

R. SALT.—2s. 2d. per lb. 100% basis d/d.

SODIUM NAPHTHIONATE.—1s. 8½d. per lb. 100% basis d/d.

*o*-TOLUIDINE.—8d. per lb. naked at works.

*p*-TOLUIDINE.—2s. 2d. per lb. naked at works.

*m*-XYLIDINE ACETATE.—2s. 11d. per lb. 100%.

## Wood Distillation Products

ACETATE OF LIME.—Brown, £9 5s. per ton. Grey, £15 10s. per ton

Liquor, 9d. per gall. 32° Tw.

CHARCOAL.—£7 to £10 per ton, according to grade and locality.

IRON LIQUOR.—1s. 3d. per gall. 32° Tw. 1s. per gall. 24° Tw.

RED LIQUOR.—9d. to 1s. per gall. 16° Tw.

WOOD CREOSOTE.—1s. 9d. per gall. Unrefined.

WOOD NAPHTHA, MISCIBLE.—4s. per gall., 60% O.P. Solvent, 4s. 3d. per gall., 40% O.P.

WOOD TAR.—£4 to £5 10s. per ton and upwards, according to grade.

BROWN SUGAR OF LEAD.—£41 to £42 per ton.

## Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 6d. to 1s. 5½d. per lb., according to quality, Crimson, 1s. 3d. to 1s. 7½d. per lb., according to quality.

ARSENIC SULPHIDE, YELLOW.—2s. per lb.

BARYTES.—£3 10s. to £6 15s. per ton, according to quality.

CADMIUM SULPHIDE.—2s. 9d. per lb.

CARBON BISULPHIDE.—£20 to £25 per ton, according to quantity.

CARBON BLACK.—5½d. per lb., ex wharf.

CARBON TETRACHLORIDE.—£46 to £55 per ton, according to quantity, drums extra.

CHROMIUM OXIDE, GREEN.—1s. 2d. per lb.

DIPHENYLGUANIDINE.—3s. 9d. per lb.

INDIARUBBER SUBSTITUTES, WHITE AND DARK.—5¾d. to 6¾d. per lb.

LAMP BLACK.—£35 per ton, barrels free.

LEAD HYPOSULPHITE.—9d. per lb.

LITHOPONE, 30%.—£22 10s. per ton.

MINERAL RUBBER "RUBPRON."—£13 12s. 6d. per ton, f.o.r. London.

SULPHUR.—£9 to £11 per ton, according to quality.

SULPHUR CHLORIDE.—4d. per lb., carboys extra.

SULPHUR PRECIP. B.P.—£47 10s. to £50 per ton.

THIOCARBAMIDE.—2s. 6d. to 2s. 9d. per lb. carriage paid.

THIOCARBANILIDE.—2s. 1d. to 2s. 3d. per lb.

VERMILION, PALE OR DEEP.—5s. 3d. per lb.

ZINC SULPHIDE.—1s. 1d. per lb.

## Pharmaceutical and Photographic Chemicals

ACID, ACETIC, PURE, 80%.—£39 per ton ex wharf London in glass containers.
ACID, ACETYL SALICYLIC.—2s. 5d. to 2s. 6d. per lb. Brisk.
ACID, BENZOIC B.P.—2s. to 2s. 3d. per lb., according to quantity. Solely ex Gum, 1s. 3d. per oz.; 500 oz. lots, 1s. per oz.
ACID, BORIC B.P.—Crystal, £41 per ton; powder, £45 per ton. Carriage paid any station in Great Britain, in ton lots.
ACID, CAMPHORIC.—19s. to 21s. per lb.
ACID, CITRIC.—1s. 4d. to 1s. 4½d. per lb., less 5%. Very firm.
ACID, GALLIC.—2s. 8d. per lb. for pure crystal, in cwt. lots.
ACID, PYROGALLIC, CRYSTALS.—7s. 3d. per lb. Resublimed, 8s. 3d. per lb.
ACID, SALICYLIC, B.P.—1s. 4d. to 1s. 6d. per lb. Technical.—11¾d. to 1s. per lb.
ACID, TANNIC B.P.—2s. 9d. to 2s. 11d. per lb.
ACID, TARTARIC.—1s. 1¾d. per lb., less 5%. Very fine market.
AMIDOL.—9s. per lb., d/d.
ACETANILIDE.—1s. 6d. to 1s. 8d. per lb. for quantities.
AMIDOPYRIN.—11s. 3d. to 11s. 6d. per lb.
AMMONIUM BENZOATE.—3s. 3d. to 3s. 6d. per lb., according to quantity.
AMMONIUM CARBONATE B.P.—£37 per ton. Powder, £39 per ton in 5 cwt. casks. Resublimated: lump, 1s. per lb.; powder, 1s. 3d. per lb.
ATROPINE SULPHATE.—11s. per oz. for English make.
BARBITONE.—8s. 9d. per lb.
BENZONAPHTHOL.—3s. 3d. per lb. spot.
BISMUTH CARBONATE.—12s. 3d. to 14s. 3d. per lb.
BISMUTH CITRATE.—9s. 3d. to 11s. 3d. per lb.
BISMUTH SALICYLATE.—10s. to 12s. per lb.
BISMUTH SUBNITRATE.—10s. 6d. to 12s. 6d. per lb., all above bismuth salts, according to quantity.
BISMUTH NITRATE.—6s. 9d. per lb.
BISMUTH OXIDE.—13s. 9d. per lb.
BISMUTH SUBCHLORIDE.—11s. 9d. per lb.
BISMUTH SUBGALLATE.—9s. 9d. per lb.
BORAX B.P.—Crystal, £24 per ton; powder, £25 per ton. Carriage paid any station in Great Britain, in ton lots.
BROMIDES.—Potassium, 1s. 11d. to 2s. 1d. per lb.; sodium, 2s. 2d. to 2s. 4d. per lb.; ammonium, 2s. 4d. to 2s. 6d. per lb., all spot.
CALCIUM LACTATE.—1s. 4d. to 1s. 5d.
CHLORAL HYDRATE.—3s. 2d. to 3s. 5d. per lb., duty paid.
CHLOROFORM.—2s. 3d. to 2s. 7½d. per lb., according to quantity.
CREOSOTE CARBONATE.—6s. per lb.
ETHER METH.—1s. 1d. to 1s. 11½d. per lb., according to sp. gr. and quantity. Ether purif. (Aether B.P., 1914), 2s. 3d. to 2s. 4d., according to quantity.
FORMALDEHYDE.—£39 per ton, in barrels ex wharf.
GUAIACOL CARBONATE.—6s. 6d. to 7s. per lb.
HEXAMINE.—2s. 4d. to 2s. 6d. per lb.
HOMATROPINE HYDROBROMIDE.—30s. per oz.
HYDRASTINE HYDROCHLORIDE.—English make offered at 120s. per oz.
HYDROGEN PEROXIDE (12 VOLS.).—1s. 5d. per gallon f.o.r. makers' works, naked.
HYDROQUINONE.—4s. per lb., in cwt. lots.
HYPOPHOSPHITES.—Calcium, 3s. 6d. per lb., for 28-lb. lots; potassium, 4s. 1d. per lb.; sodium, 4s. per lb.
IRON AMMONIUM CITRATE B.P.—2s. 1d. to 2s. 4d. per lb. Green, 2s. 4d. to 2s. 9d. per lb. U.S.P., 2s. 2d. to 2s. 5d. per lb.
IRON PERCHLORIDE.—22s. per cwt., 112 lb. lots.
MAGNESIUM CARBONATE.—Light Commercial, £33 per ton net.
MAGNESIUM OXIDE.—Light commercial, £67 10s. per ton, less 2½%; Heavy Commercial, £22 per ton, less 2½%; in quantity lower; Heavy Pure, 2s. to 2s. 3d. per lb., in 1 cwt. lots.
MENTHOL.—A.B.R. recrystallised B.P., 18s. 9d. per lb. net; Synthetic, 10s. 6d. to 12s. per lb., according to quantity; 10s. 6d. for 1 cwt. lots and upwards; Liquid (95%), 12s. per lb.; Detached Cryst., 14s. 6d. per lb.
MERCURIALS.—Red Oxide, 6s. 11d. to 7s. 1d. per lb., levig., 6s. 7d. per lb.; Corrosive Sublimate, Lump, 5s. 2d. to 5s. 4d. per lb., Powder, 4s. 9d. per lb.; White Precipitate, Lump, 5s. 4d. to 5s. 6d. per lb., Powder, 5s. 7d. per lb., Extra Fine, 5s. 7d. to 5s. 8d. per lb.; Calomel, 5s. 9d. to 5s. 11d. per lb.; Yellow Oxide, 6s. 4d. to 6s. 5d. per lb.; Persulph., B.P.C., 5s. 7d. to 5s. 8d. per lb.; Sulph. nig., 5s. 4d. to 5s. 5d. per lb.
METHYL SALICYLATE.—1s. 8d. per lb.
METHYL SULPHONAL.—15s. to 15s. 3d. per lb.
METOL.—11s. per lb. British make.
PARAFORMALDEHYDE.—1s. 9d. per lb. for 100% powder.
PARALDEHYDE.—1s. 4d. per lb.
PHENACETIN.—3s. 9d. to 4s. per lb.
PHENAZONE.—5s. 9d. to 6s. per lb.
PHENOLPHTHALEIN.—6s. to 6s. 3d. per lb.
POTASSIUM BITARTRATE 99/100%(Cream of Tartar).—94s. per cwt., less 2½% for ton lots. Very firm market.
POTASSIUM CITRATE.—1s. 11d. to 2s. 2d. per lb.
POTASSIUM FERRICYANIDE.—1s. 9d. per lb., in cwt. lots.
POTASSIUM IODIDE.—16s. 8d. to 17s. 2d. per lb. for 1 cwt. lots.
POTASSIUM METABISULPHITE.—6d. per lb., 1-cwt. kegs included, f.o.r. London.
POTASSIUM PERMANGANATE.—B.P. crystals, 6d. per lb., spot.
QUININE SULPHATE.—2s. per oz., 1s. 8d. to 1s. 9d. for 1000 oz. lots in 100 oz. tins.
RESORCIN.—4s. per lb., spot.
SACCHARIN.—55s. per lb.
SALOL.—3s. to 3s. 3d. per lb.
SODIUM BENZOATE, B.P.—1s. 10d. to 2s. 2d. per lb.
SODIUM CITRATE, B.P.C., 1911.—1s. 8d. to 1s. 11d. per lb., B.P.C., 1923—2s. to 2s. 1d. per lb. for 1 cwt. lots. U.S.P., 1s. 11d. to 2s. 2d. per lb., according to quantity.
SODIUM FERROCYANIDE.—4d. per lb., carriage paid.
SODIUM HYPOSULPHITE, PHOTOGRAPHIC.—£15 5s. per ton, d/d consignee's station in 1-cwt. kegs.
SODIUM NITROPRUSSIDE.—16s. per lb.
SODIUM POTASSIUM TARTRATE (ROCHELLE SALT).—77s. 6d. to 82s. 6d. per cwt., according to quantity.
SODIUM SALICYLATE.—Powder, 1s. 9d. to 1s. 10d. per lb. Crystal, 1s. 10d. to 1s. 11d. per lb.
SODIUM SULPHIDE, PURE RECRYSTALLISED.—10d. to 1s. 2d. per lb.
SODIUM SULPHITE, ANHYDROUS, £27 10s. to £28 10s. per ton, according to quantity; 1-cwt. kegs included.
SULPHONAL.—10s. to 10s. 3d. per lb.
TARTAR EMETIC, B.P.—Crystal or powder, 2s. to 2s. 1d. per lb.
THYMOL.—Puriss., 11s. 6d. to 12s. per lb., according to quantity. Firmer. Natural, 14s. 9d. per lb. Cheaper.

## *Perfumery Chemicals*

ACETOPHENONE.—7s. 3d. per lb.
AUBEPINE (EX ANETHOL), 10s. 3d. per lb.
AMYL ACETATE.—2s. per lb.
AMYL BUTYRATE.—5s. 6d. per lb.
AMYL SALICYLATE.—3s. per lb.
ANETHOL (M.P. 21/22° C.).—5s. 6d. per lb.
BENZYL ACETATE FROM CHLORINE-FREE BENZYL ALCOHOL.—2s. per lb.
BENZYL ALCOHOL FREE FROM CHLORINE.—2s. per lb.
BENZALDEHYDE FREE FROM CHLORINE.—2s. 6d. per lb.
BENZYL BENZOATE.—2s. 3d. per lb.
CINNAMIC ALDEHYDE NATURAL.—18s. 6d. per lb.
COUMARIN.—10s. 9d. per lb.
CITRONELLOL.—14s. 6d. per lb.
CITRAL.—9s. 6d. per lb.
ETHYL CINNAMATE.—10s. per lb.
ETHYL PHTHALATE.—3s. per lb.
EUGENOL.—9s. 6d. per lb.
GERANIOL (PALMAROSA).—19s. per lb.
GERANIOL.—6s. 6d. to 10s. 6d. per lb.
HELIOTROPINE.—4s. 9d. per lb.
ISO EUGENOL.—13s. 6d. per lb.
LINALOL.—Ex Shui Oil, 12s. per lb. Ex Bois de Rose, 16s. per lb.
LINALYL ACETATE.—Ex Shui Oil, 14s. 6d. per lb. Ex Bois de Rose, 18s. per lb.
METHYL ANTHRANILATE.—9s. per lb.
METHYL BENZOATE.—4s. 6d. per lb.
MUSK KETONE.—36s. per lb.
MUSK XYLOL.—8s. 6d. per lb.
NEROLIN.—3s. 9d. per lb.
PHENYL ETHYL ACETATE.—12s. per lb.
PHENYL ETHYL ALCOHOL.—11s. per lb.
RHODINOL.—28s. 6d. per lb.
SAFROL.—1s. 6d. per lb.
TERPINEOL.—1s. 6d. per lb.
VANILLIN.—18s. 6d. per lb.

## Essential Oils

ALMOND OIL.—11s. 6d. per lb.
ANISE OIL.—3s. 3d. per lb.
BERGAMOT OIL.—30s. per lb.
BOURBON GERANIUM OIL.—11s. 3d. per lb.
CAMPHOR OIL.—63s. 6d. per cwt.
CANANGA OIL, JAVA.—22s. 6d. per lb.
CINNAMON OIL LEAF.—6d. per oz.
CASSIA OIL, 80/85%.—8s. 9d. per lb.
CITRONELLA OIL.—Java, 85/90%, 2s. 3d. per lb. Ceylon, pure 1s. 10d. per lb.
CLOVE OIL.—6s. per lb.
EUCALYPTUS OIL, 70/75%.—2s. per lb.
LAVENDER OIL.—Mont Blanc, 38/40%, Esters, 20s. 9d. per lb.
LEMON OIL.—10s. per lb.
LEMONGRASS OIL.—4s. 6d. per lb.
ORANGE OIL, SWEET.—10s. 6d. per lb.
OTTO OF ROSE OIL.—Bulgarian, 70s. per oz. Anatolian, 30s. per oz.
PALMA ROSA OIL.—9s. 6d. per lb.
PEPPERMINT OIL.—Wayne County, 20s. per lb. Japanese, 8s. 6d. per lb. Firm.
PETITGRAIN OIL.—8s. 3d. per lb.
SANDALWOOD OIL.—Mysore, 26s. per lb. Australian, 17s. 3d. per lb.

# London Chemical Market

*The following notes on the London Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.*

*London, March* 16, 1927.

A FAIR volume of business is reported during the past week, although on the whole the turnover is somewhat disappointing. Except for adjustments in price consequent upon the removal of the import duty from certain chemicals, the prices remain very firm, and the general tendency is in an upward direction. Export inquiry is fair.

## General Chemicals

ACETONE is in fair demand, and price steady at £57 10s. per ton.
ACID ACETIC is in good demand on home trade account, but export inquiry is very slow.
ACID CITRIC is firm at 1s. 4d. per lb., and seems likely to advance.
ACID FORMIC.—The demand is steady, although of somewhat small dimensions. Price unchanged at £47 to £48 per ton.
ACID LACTIC is unchanged at £43 per ton, for 50% by weight.
ACID OXALIC.—The new prices consequent upon the removal of the duty have now been fixed, and vary from £27 to £30 per ton, ex wharf, according to point of delivery.
ACID TARTARIC is in good demand. Price is higher at 1s. 2d. per lb.
ALUMINA SULPHATE is quiet at about £6 5s. per ton, for 17-18% grade.
AMMONIUM CHLORIDE is in very poor demand, price nominally £19 10s. per ton.
COPPER SULPHATE.—Unchanged at £24 10s. per ton.
CREAM OF TARTAR.—Remains very firm market. Supplies are very scarce, and the price is £95 per ton.
EPSOM SALTS.—Unchanged.
FORMALDEHYDE is without special feature. Price £41 per ton.
LEAD ACETATE is a firm market at £44 10s. per ton, for white, and £43 for brown.
METHYL ACETATE.—Unchanged.
METHYL ALCOHOL.—Unchanged.
POTASSIUM CHLORATE is firm, at 3½d. per lb.
POTASSIUM PERMANGANATE is a slow market. Price unchanged at 7¼d. per lb., for high grade material.
POTASSIUM PRUSSIATE is quiet but steady, at 7½d. per lb.
SODIUM ACETATE is in fair demand at £19 10s. per ton.
SODIUM BICHROMATE is unchanged.
SODIUM HYPOSULPHITE.—Unchanged.
SODIUM NITRITE is steady at £19 10s. per ton.
SODIUM PRUSSIATE is firm at 4¼d. to 4½d. per lb.
SODIUM SULPHIDE.—Unchanged.
ZINC SULPHATE.—Unchanged.

## Coal Tar Products

A certain easing down in the prices of one or two coal tar products has been evident during the week.
90's BENZOL is momentarily affected by the fall in the price of petrol. Its value is about 1s. 9d. per gallon, on rails, while the motor quality is worth about 1s. 8d. per gallon.
PURE BENZOL is quoted at from 2s. 6d. to 2s. 9d. per gallon, on rails.
CREOSOTE OIL is rather more plentiful, and can be bought at from 7d. to 7¼d. per gallon, on rails in the North, while the price in London remains stationary at about 8¼d. to 8¾d. per gallon.
CRESYLIC ACID is also weaker, the pale quality, 97/99% being worth about 1s. 11d. per gallon, on rails, while the dark quality, 95/97 %, is quoted at 1s. 9½d. per gallon, on rails.
SOLVENT NAPHTHA is weak, and is worth about 1s. 4d. to 1s. 4½d. per gallon, on rails.
HEAVY NAPHTHA is fairly steady, at 1s. 2d. to 1s. 3d. per gallon, on rails.
NAPHTHALENES remain quite firm, the 76/78 quality being quoted at £8 5s. to £8 15s. per ton, while the 74/76 quality is quoted at £7 10s. to £8 per ton.
PITCH.—There is little change to report, but prices are somewhat easier. Today's value is 110s. to 120s., f.o.b. U.K. port.

## Latest Oil Prices

LONDON.—March 16.—LINSEED OIL, steady and about unchanged. Spot, £31 10s., ex mill; March, £30 2s. 6d.; April, £30 5s.; May-August, £30 7s. 6d.; September-December, £31. RAPE OIL slow. Crude extracted, £45; technical refined, naked, £47, ex wharf. COTTON OIL quiet. Refined common edible, £41; Egyptian crude, £35; deodorised, £43. TURPENTINE steady and occasionally 6d. per cwt. higher. American, spot, 48s. 3d.; April, 48s. 6d.; May-June, 49s. 3d.; and July-December, 50s. 6d.

HULL.—March 16.—LINSEED OIL.—Naked spot, £31; March to May-August, £30 17s. 6d.; September-December, £31 2s. 6d. COTTON OIL.—Naked Bombay crude, £33; Egyptian crude, £34; edible refined, £38 5s.; technical, £37 15s.; deodorised, £40 5s. PALM KERNEL OIL.—Crushed naked, 5½ per cent., £38 10s. GROUND NUT OIL.—Crushed-extracted, £44 10s.; deodorised, £48 10s. SOYA OIL.—Extracted and crushed, £34; deodorised, £37 10s. RAPE OIL.—Crude-extracted, £44 10s.; refined, £46 10s. per ton. COD OIL.—Spot, 29s. 3d. per cwt., barrels, net cash terms, ex mill.

## Nitrogen Products

*Export.*—During the past week the export position remained unchanged, and British producers are still selling at about £10 17s. 6d. per ton, f.o.b. U.K. port in single bags. News from the Continent indicates that the consumption of sulphate of ammonia is going ahead satisfactorily, and even in Germany an increase in consumption is looked for. Sales for prompt delivery have been made for other continental countries. The Far East is still in the market, and it seems likely that in view of this activity in several places only small stocks of sulphate of ammonia will be carried over at the end of the year.

*Home.*—On account of the bad weather the home demand has been somewhat sluggish, but renewed activity is reported in several districts on account of the sunshine of the last day or two. British producers are now offering ordinary quality in several districts. The price for this grade is 10s. per ton below neutral prices, basis 20% nitrogen, no charge if over, *pro rata* allowance if under.

*Nitrate of Soda.*—The usual spring demand is absorbing the stocks of nitrate of soda at continental ports. Large stocks remain in Chile and shipments are going forward from there to the United States. Apart from the United States there is a decrease in demand for nitrate in almost all centres of consumption. Consumers are finding that on account of the high prices ruling for this commodity, other nitrogenous manures are better propositions.

## Calcium Cyanamide

BY reason of the lateness of the season, inquiries for this fertiliser continue to be active. In particular, it promises to be in considerable demand for use on the sugar beet crop. The price for March is £9 16s. per ton delivered in 4-ton lots, carriage paid to any railway station in Great Britain.

## A Yacca Gum Contract

### Disputed Claim by Bleachers

IN the Mayor's and City of London Court, last week, before the Recorder, Sir Ernest Wild, K.C., Shellac Bleachers, Ltd., 106, Bevington Street, Bermondsey, brought an action against David Thomson and Co., 1, Laurence Pountney Hill, E.C., claiming £1,949 0s. 7d., made up of £64 5s. 4d. due for bleaching two tons of Yacca, or grass tree gum, £4 5s. 4d. carriage to plaintiffs' factory, and the balance as damages for breach of contract on the part of the defendants in not delivering a total of 100 tons of Yacca gum to be bleached at an agreed price of £30 per ton. The defendants counterclaimed £4,500 as damages for failure of the plaintiffs to bleach the gum satisfactorily. It was stated that the bleached product was to be called Tampalac, and was to be put on the market as a substitute for shellac.

The Recorder, in giving judgment, said that the defendants contended that the process used by the plaintiffs did not bleach the gum, or delete the dye, or bring the colour up to that of a sample supplied prior to the making of the contract. He found as a fact that the plaintiffs had not fulfilled the terms of the contract under that head. Therefore, the question of damages did not arise. As to the counterclaim, owing to the fact that the defendants had themselves instructed the plaintiffs not to continue bleaching, the damage suffered by them could be only nominal. He gave judgment for the defendants on the claim, with costs, and on the counterclaim for 40s. with costs. It was agreed between the parties to waive the questions of the £4 5s. 4d. for cartage, and £75 4s. 9d. received by the plaintiffs from sales of raw gum.

PROFESSOR H. T. BARNES, ex-Professor of Physics at McGill University, Montreal, has carried out some successful experiments on the destruction of icebergs by "Thermit."

# Scottish Chemical Market

*The following notes on the Scottish Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.*

*Glasgow, March* 16, 1927.

BUSINESS in the heavy chemical market has been somewhat quieter during the past week, but the proportion of orders in relation to inquiry going round has been good. Since our last report advice has been received of the removal of Key Industry Duty from oxalic acid. Prices for other products are at about same level as last reported.

## Industrial Chemicals

ACID ACETIC.—98/100%, £55 to £67 per ton, according to quantity and packing, c.i.f. U.K. ports; 80% pure, £37 10s. per ton, ex wharf; 80% technical, £37 10s. per ton, ex wharf.

ACID BORIC.—Crystal, granulated or small flakes, £34 per ton; powder, £36 per ton, packed in bags, carriage paid U.K. stations.

ACID CARBOLIC, ICE CRYSTALS.—Now quoted 5⅝d. per lb., delivered f.o.b. U.K. ports, with inquiry moderate.

ACID CITRIC, B.P. CRYSTALS.—Still in good demand, and price unchanged at about 1s. 4d. per lb., less 5%, ex store, spot delivery.

ACID HYDROCHLORIC.—Usual steady demand. Arsenical quality, 4s. 9d. per carboy. Dearsenicated quality, 6s. 3d. per carboy, ex works.

ACID NITRIC, 80°.—Quoted £23 5s. per ton, ex station, full truck loads.

ACID OXALIC, 98/100%.—On offer from the Continent at about 3d. per lb., c.i.f. U.K. ports.

ACID SULPHURIC, 144°.—£3 12s. 6d. per ton; 168°, £7 per ton, ex works, full truck loads. Dearsenicated quality, 20s. per ton more.

ACID TARTARIC, B.P. CRYSTALS.—Some supplies available at 1s. 1d. per lb., less 5%, ex store, quoted at about same price ex wharf, for prompt shipment.

ALUMINA SULPHATE, 17/18%, IRON FREE.—Spot material on offer at about £6 per ton, ex store. Quoted £5 8s. 6d. per ton, c.i.f. U.K. ports, prompt shipment from the Continent.

ALUM POTASH.—Lump quality now offered at about £8 per ton, c.i.f. U.K. ports. Crystal powder 5s. per ton less. Lump quality on spot at £9 per ton. Crystal powder, £8 7s. 6d., ex store.

AMMONIA ANHYDROUS.—On offer at 9¾d. per lb., ex store. Containers extra and returnable

AMMONIA CARBONATE.—Lump, £37 per ton; powder, £39 per ton, packed in 5-cwt. casks, delivered or f.o.b. U.K. ports.

AMMONIA LIQUID, 880°.—Unchanged at about 2½d. to 3d. per lb. delivered, according to quantity.

AMMONIA MURIATE.—Grey galvanisers' crystals of English manufacture unchanged at about £23 to £24 per ton, ex station. Continental on offer at about £20 10s. per ton, c.i.f. U.K. ports. Fine white crystals quoted £18 5s. per ton, c.i.f. U.K. ports.

ARSENIC, POWDERED.—Spot material quoted £19 15s. per ton, ex store. *Offered for prompt dispatch from mines at £18 15s.* per ton, ex wharf.

BARIUM CARBONATE 98/100%.—White powdered quality quoted £6 15s. per ton, c.i.f. U.K. ports.

BARIUM CHLORIDE, 98/100%.—Large white crystals quoted £8 per ton, c.i.f. U.K. ports. Spot material on offer at £9 10s. per ton, ex store.

BARYTES.—English material unchanged at £5 5s. per ton, ex works. Continental quoted £5 per ton, c.i.f. U.K. ports.

BLEACHING POWDER.—Contract price to consumers, £8 per ton, ex station, minimum 4-ton lots. Spot material 10s. per ton extra. Continental now quoted £7 10s. per ton, c.i.f. U.K. ports.

BORAX.—Granulated, £19 10s. per ton; crystals, £20 per ton; powder, £21 per ton, carriage paid U.K. ports.

CALCIUM CHLORIDE.—English manufacturers' price unchanged at £5 12s. 6d. to £5 17s. 6d. per ton, ex station. Continental quoted £3 15s. per ton, c.i.f. U.K. ports.

COPPERAS, GREEN.—Unchanged at about £3 10s. per ton, f.o.r. works, or at £4 12 6d. per ton, f.o.b. U.K. ports for export.

COPPER SULPHATE.—English material now quoted £23 5s. per ton, f.o.b. U.K. ports. Continental advanced to about £22 10s. per ton, c.i.f. U.K. ports.

FORMALDEHYDE, 40%.—Quoted £38 10s. per ton, c.i.f. U.K. ports. Spot material available at about £40 per ton, ex store.

GLAUBER SALTS.—English material unchanged at £4 per ton, ex store or station. Continental now quoted £2 15s. per ton, c.i.f. U.K. ports.

LEAD, RED.—Imported material offered at about £34 10s. per ton, ex store.

LEAD, WHITE.—Quoted £36 per ton, ex store.

LEAD ACETATE.—White crystals quoted £42 15s. per ton, c.i.f. U.K. ports; brown, about £40 5s. per ton, c.i.f. U.K. ports; white crystals on spot quoted £44 5s. per ton, ex store.

MAGNESITE, GROUND CALCINED.—Quoted £8 10s. per ton, ex store, in moderate demand.

MAGNESIUM CHLORIDE.—Quoted £6 6s. 6d. per ton, c.i.f. U.K. ports.

POTASH, CAUSTIC, 88/92%.—Solid quality unchanged at £27 5s. per ton, c.i.f. U.K. ports, minimum 15-ton lots. Smaller quantities 15s. per ton extra. Liquid, 50° Be, £14 10s. per ton, c.i.f. U.K. ports, minimum 15-ton lots.

POTASSIUM BICHROMATE.—Unchanged at 4½d. per lb., delivered.

POTASSIUM CARBONATE.—96/98%, now quoted £25 15s. per ton, ex wharf, early delivery. Spot material available at about £37 per ton, ex store; 90/94% quality quoted £22 10s. per ton, c.i.f. U.K. ports.

POTASSIUM CHLORIDE.—Powdered quality on offer from the Continent at about £23 17s. 6d. per ton, c.i.f. U.K. ports; crystals, £2 per ton extra.

POTASSIUM NITRATE.—Spot material on offer at £22 10s. per ton, ex store. Offered for prompt shipment from the Continent at about £21 per ton, c.i.f. U.K. ports.

POTASSIUM PERMANGANATE, B.P. CRYSTALS.—Quoted 6¾d. per lb., ex store, spot delivery. On offer for early shipment at 6½d. per lb., ex wharf.

POTASSIUM PRUSSIATE (YELLOW).—In good demand, and price unchanged at about 7½d. per lb., ex store, spot delivery. Offered from the Continent at 7¼d. per lb., c.i.f. U.K. ports.

SODA CAUSTIC.—Powder, 98/99%, £19 7s. 6d. per ton; 76/77%, £15 10s. per ton; 70/72%, £14 10s. per ton, carriage paid station, minimum 4-ton lots on contract. Spot material 10s. per ton extra.

SODIUM ACETATE.—English material quoted £22 10s. per ton, ex store. Continental on offer at about £19 per ton, c.i.f. U.K. ports.

SODIUM BICARBONATE.—Refined recrystallised quality, £10 10s. per ton, ex quay or station. M.W. quality, 30s. per ton less.

SODIUM BICHROMATE.—Quoted 3¾d. per lb., delivered buyers' works.

SODIUM CARBONATE (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station; powder or pea quality, £1 7s. 6d. per ton more; alkali, 59%, £8 12s. 3d. per ton, ex quay or station.

SODIUM HYPOSULPHITE.—Large crystals of English manufacture quoted £9 2s. 6d. per ton, ex station, minimum 4-ton lots. Continental quality offered at £8 per ton, ex wharf, prompt shipment packed in bags. Casks 10s. per ton extra. Pea crystals, photographic quality of British manufacture, quoted £14 10s. per ton, ex station.

SODIUM NITRATE.—Ordinary quality quoted £13 per ton, ex store. Refined quality 5s. per ton extra.

SODIUM NITRITE, 100%.—Spot material now quoted £20 5s. per ton, ex store.

SODIUM PRUSSIATE (YELLOW).—Offered for prompt shipment from the Continent at 4¾d. per lb., ex wharf. Spot material on offer at 4¾d. per lb., ex store.

SODIUM SULPHATE (SALTCAKE).—Price for home consumption £3 7s. 6d. per ton, ex works.

SODIUM SULPHIDE.—60/65% solid, £12 10s. per ton; broken, £13 10s. per ton; flake, £14 10s. per ton; crystals, 31/34%, £8 10s. per ton, and £9 per ton, according to quality, delivered buyers' works, minimum 4-ton lots on contract. Price for spot, 5s. per ton extra for solid, 2s. 6d. per ton extra for crystals; 60/62%, solid quality offered from the Continent at about £9 7s. 6d. per ton, c.i.f. U.K. ports; broken 15s. per ton extra.

SULPHUR.—Flowers, £12 10s. per ton; roll, £11 10s. per ton; rock, £11 10s. per ton; floristella, £11 per ton; ground American, £9 15s. per ton, ex store. Prices nominal.

ZINC CHLORIDE.—British material, 98/100%, quoted £24 15s. per ton, f.o.b. U.K. ports; 98/100%, solid on offer from the Continent at about £21 15s. per ton, c.i.f. U.K. ports; powdered 20s. per ton extra.

ZINC SULPHATE.—Continental material on offer at about £10 10s. per ton, ex wharf.

NOTE.—The above prices are for bulk business, and are not to be taken as applicable to small parcels.

## Coal Tar Intermediates

ANTHRANILIC ACID.—6s. per lb. Small inquiries.

BETA NAPHTHOL.—11d. to 1s. per lb. Some inquiries.

NAPHTHIONIC ACID.—1s. 4½d. per lb. Fair inquiries.

BENZALDEHYDE.—2s. 3d. per lb. Some inquiries.

DIMETHYLANILINE.—2s. per lb. Fair inquiries.

# Manchester Chemical Market

(From Our Own Correspondent.)

*Manchester, March 17, 1927.*

The bread-and-butter lines of heavy chemicals continue to meet with a somewhat improved demand, although, of course, there is room in plenty for improvement. Home trade users, however, are calling for fair deliveries against contracts, and there is a moderate volume of new buying interests. As before, however, most of it is in respect of prompt or early delivery. Prices keep steady in most sections of the market, occasional weakness in certain instances being counterbalanced by increased strength in one or two others.

### Heavy Chemicals

There is still only a moderate demand just now for saltcake, though quotations for this material are maintained at £3 10s. per ton. A quiet trade is being put through in the case of phosphate of soda at £12 12s. 6d. to £12 15s. per ton. At 4¼d. per lb. prussiate of soda shows little material alteration in the level of prices, and a limited demand is reported this week. Caustic soda is steady and in fairly active inquiry at from £14 10s. to £16 10s. per ton, according to quality. Chlorate of soda is on the easy side and not much more than 3d. per lb. is obtainable, demand proceeding on quiet lines. Bichromate of soda, however, is arousing a certain amount of interest among buyers at steady prices, about 3⅛d. per lb. still being quoted. Bleaching powder is in moderate request and is unchanged on the week at £8 per ton. A quiet trade is being put through in hyposulphite of soda at £9 15s. per ton for commercial crystals and round £15 2s. 6d. for photographic material. Glauber salts are rather inactive, but at £3 2s. 6d. to £3 5s. per ton current values show little change from those last reported. Nitrite of soda is not particularly brisk, though quotations keep fairly steady at £19 5s. per ton. Alkali is well held at round £6 15s. per ton, and the demand for this material continues on steady lines. A quiet demand for sulphide of soda has been reported here this week; 60-65 per cent. concentrated solid is quoted at about £11 5s. per ton and commercial grade at £8 7s. 6d. In the case of bicarbonate of soda prices are well held at £10 10s. per ton, and a fair inquiry is being experienced.

Although a somewhat easier tendency is noticeable in the case of yellow prussiate of potash, values are still round 7¼d. per lb., the demand being on a moderate scale. Caustic potash is moving off in fair quantities at steady prices, £29 per ton still being quoted for this material. Carbonate of potash is in fair request at about £26 per ton. Current values of bichromate of potash are from 4⅛d. to 4¼d. per lb., and a quiet volume of buying is reported. Chlorate of potash is not particularly active, but at 3¼d. to 3⅜d. per lb. prices show little actual change compared with a week ago. Permanganate of potash is in moderate demand, and prices are maintained at 6d. per lb. for the B.P. quality and 4⅞d. to 5d. for the commercial.

There is not a great deal of business passing in the case of arsenic, and values seem to be easing off a little at £17 to £17 5s. per ton at the mines for white powdered, Cornish makes. Sulphate of copper continues very firm at about £24 15s., f.o.b., and a comparatively good trade with export markets is still reported. The lead compounds are moving off slowly, and in some cases values are slightly weaker; white acetate is quoted at £43 to £44 per ton, and brown at about £41, nitrate of lead being on offer at £39 10s. Acetate of lime continues rather quiet, but prices are fairly steady at £9 per ton for brown and £15 15s. to £16 per ton for grey quality.

### Acids and Tar Products

With the removal of the "Safeguarding," uncertainty, oxalic acid has definitely eased off again, an average value today being about 3⅜d. per lb. Both citric and tartaric acids, however, remain very firm, although in each case the demand is on the quiet side. Acetic acid keeps steady, and a fair trade is being put through; 80 per cent. commercial quality is on offer at about £37 per ton and glacial at £67.

There is little new inquiry for pitch, and prices are rather easy at from £4 10s. per ton, f.o.b. A shade more interest has been take in creosote oil at 7¼d. to 7½d. per gallon. Carbolic acid is quiet at round 6d. per lb. for crystal and 1s. 9d. per gallon for crude. Solvent naphtha is slow at 1s. 6¼d. per gallon.

# Failure of E. G. Sawyer and Co.

### An Adventure in Dyestuffs Merchanting

In the bankruptcy of Ernest George Sawyer, dye and chemical merchant, 110, Fenchurch Street, London, E.C., and late of Orchard Street, Pendleton, Manchester, which occurred on January 19, the Official Receiver has now issued to creditors a summary of the debtor's statement of affairs. This discloses liabilities £27,176, of which £10,776 are expected to rank; there being 59 creditors wholly unsecured with debts returned at £4,873. The assets are estimated at £7,870, and a deficiency of £2,906 is accordingly disclosed.

In his observations the Official Receiver reports that the receiving order was made on the petition of the debtor, who was adjudged bankrupt on January 19. The bankrupt states that from 1913 until August, 1922, he was employed by oil brokers in St. Mary Axe, E.C., latterly as manager of their dye department, at a salary of £1,000 per annum and commission, which averaged for the last 18 months between £5,000 and £6,000 per annum. In January, 1923, he, with a capital of £11,000, commenced business as a dyestuff and chemical merchant under the style of E. G. Sawyer and Co., at No. 110, Fenchurch Street, E.C., and during his trading he was financed by his bankers, who held security including warrants for dyes and, latterly, a charge on his freehold residence. In July, 1923, he opened a branch in Church, Accrington; a year later he removed to Orchard Street, Pendleton, where he also traded until December, 1926, when he closed it. The bulk of his trading was in reparation dyestuffs, which he purchased through his largest creditors under contracts. In consequence of the coal strike one of his contracts was extended for three months, but he could not then complete it by taking and paying for the dyes, and after negotiations his largest creditors agreed to extend their limit (£10,000) of credit, against which they already held dyes valued at £6,000, on condition that he gave them additional security, and he thereupon gave them further stock valued at £4,000.

The debtor also signed an agreement, dated October 18, 1926, whereby he agreed to charge to his largest creditors the said additional stock, two debentures for £500 each in New Detergents, Ltd., dyestuffs and a freehold dwelling house which were already charged to his bankers and 1,050 ordinary and 50 preference shares of £1 each in H. C. Taylor, Ltd. In 1925 he lost £3,631 by speculating in forward purchases of rubber. In July, 1925, he and two other persons registered a company to manufacture a new soap for scouring wool; he paid the registration expenses, was allotted 500 of the vendor's shares and became managing director of the company, which carried on business until October, 1926. He financed it from time to time, and it now owes him £1,339, in respect of which he holds two debentures for £500 each. In September, 1925, he financed another company in which he was given 1,000 £1 ordinary shares; he also purchased 50 preference shares of £1 each and became director of it. His largest creditors declined to enter into further contracts with him and in November and December, 1926, creditors began to press; in January, 1927, meetings of his creditors were held, but as the largest creditors were not prepared to waive their rights under the agreement referred to nothing was done and he therefore filed his petition. The bankrupt attributes his insolvency to lack of profit to meet his drawings, to lack of business during the coal strike, to fall in prices and to loss by speculation in forward purchases of rubber and in connection with the soap company.

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### Sirop Famel—Two Trade Marks Expunged

On Wednesday, in the Chancery Division, Mr. Justice Clauson had before him an action by Lacteosote, Ltd., the sole wholesale agents for the sale of Sirop Famel in Great Britain, to restrain the alleged infringement by Mr. A. Alberman, a dealer in proprietary drugs, of the registered trade marks of two labels, one being in substance an English translation of the other, which was in French. The defendant sought to rectify the register by removing from it the two trade marks in question, registered in 1907 and 1925. His lordship held that the plaintiffs' action failed and must be dismissed, and the register rectified by expunging both the 1907 and 1925 trade marks. The plaintiffs to pay the costs.

# Company News

ENGLISH MARGARINE CO.—A dividend of 8 per cent. is proposed on the ordinary shares for the past year.

AMERICAN CYANAMID CO.—A dividend of 1½ per cent. has been declared on the preferred stock and 1 per cent., plus ½ per cent. extra, on the common stock, payable on April 1.

HADFIELDS, LTD.—The directors recommend a dividend on the ordinary shares, for the year ended December 31 last, at the rate of 2½ per cent. For the year 1925 the rate was 3 per cent. and for 1924, 2½ per cent.

SHAWINIGAN WATER AND POWER.—The gross earnings for 1926 amounted to $7,660,207, compared with $6,702,034 in 1925. There remained after payment of the dividends a surplus for the year of $557,323, bringing the total surplus, after placing $50,000 to reserve, up to $758,859.

WAXED PAPERS, LTD.—The profit for the past year was £16,791 and £4,630 was brought forward, making a total of £21,421. The dividend on the 7½ per cent. cumulative preference shares absorbs £9,374 and the sum of £2,500 is placed to reserve. The 5 per cent. on the ordinary shares absorbs £5,035, leaving to be carried forward £4,511.

BRUNNER, MOND AND CO.—The directors announce an ordinary dividend for the three months ended December 31, 1926, at the rate of 17½ per cent. per annum, making 7⅞ per cent. for the nine months, less tax, equivalent to 10½ per cent. for a year. The sum of £10,964 is carried forward. The dividend for the year ended March 1926 was 10½ per cent., as in the two previous years.

BROKEN HILL SOUTH.—An interim report covering the half-year ended December 31 last states that the estimated revenue from the treatment of crude ore and deleaded residues (including porportion of realisations from production of previous periods), interest, and sundry income amounted to £614,000, and expenses, debenture interest, depreciation, provision for taxes, royalty, and redemption of debentures to £434,000, leaving an estimated surplus of £180,000.

EVANS, SONS, LESCHER, AND WEBB.—The first report, covering the period from November 24, 1925, to December 31 last, states that as a result of the reconstruction of the old company, the new company commences operations free of debentures and with tangible assets only. After deducting all interest and other charges there was a net profit for the period of £14,157. It is proposed to pay a dividend of 6 per cent. on the preference shares from the dates of allotment up to June 30, requiring £6,497, and the balance of £7,660 is carried forward.

UNITED ALKALI CO., LTD.—The net profit for the year 1926 amounted to £195,765, making with £103,709 brought forward, a total of £299,474. It is proposed to pay a dividend on the ordinary shares at 10 per cent. per annum, leaving to carry forward £11,708. The report states that the company suffered severely by the general strike and long-continued coal stoppage. In consequence, the company's works in this country lost both employment and revenue, and, of the profits for the year, a much greater proportion than usual was provided from the company's works abroad.

JOSEPH NATHAN AND CO.—The accounts for the year ended September 30 show a net profit of £53,253, against £50,693 for 1924-25, and a balance brought forward of £69,524, after deducting £25,759, the amount written off development accounts, and £1,326 for reorganisation expenses, and also £52,500 for 1½ year's dividend—to January 1, 1926—paid on the "A" seven per cent. preference shares, there remains £43,192. Since the close of the year two further half-yearly dividend payments have been made on the preference shares, absorbing £35,000, leaving a balance of £8,192 in the appropriation account. Preference dividends, therefore, are now paid up to date. During the year a reorganisation scheme has been completed, the assets being written down by about £286,686, and the issued capital reduced from £1,013,540 to £728,694.

SALT UNION, LTD.—For the year ended December 31 last, the net profit amounts to £217,565, which, after adding the balance of £19,784 brought forward from 1925 and deducting the debenture interest for the year (£42,292) leaves an available balance of £195,057. It is proposed to pay a dividend of 2s. 6d. per share on ordinary shares, place to staff superannuation fund £1,000, and to carry forward £24,057. The report states that the total quantity of salt delivered showed a considerable decline as compared with the previous year. There were gains in certain markets, while in others there were substantial losses, due to the disturbed conditions which prevailed in the industrial world throughout the greater part of the year. Imports of foreign salt into Great Britain amounted to 62,301 tons, showing a slight decrease of 2,318 tons. Nevertheless this competition has compelled the Union to accept unremunerative price for a considerable portion of their production. The annual meeting will be held at Liverpool on March 22, at 12 noon

INTERNATIONAL NICKEL CO.—The operating profit for the twelve months ended December 31, 1926, was $7,191,283, from which was deducted $1,072,236 for depreciation of plants and $456,624 for depletion of ore reserves, and $106,154 for Orford works property expense, leaving a net profit of $5,556,267, compared with a net profit of $4,237,400 for the preceding nine months. After deduction for preferred dividends ($534,756) and common dividends ($3,346,768) and adjustment due to disposal of New Caledonia properties, amounting to $296,353, the surplus on December 31, 1926, was $16,680,482, an increase of $1,378,389. The report states that the company has no serious problems to face in the immediate future. The company's products are constantly improving in quality and operating costs are being satisfactorily lowered. The management has every reason to believe that the company is still in a period of constructive expansion, which its established sales methods are well designed to promote and which should not be checked by anything less than acute and widespread business depression.

## Chemical Trade Inquiries

*The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.*

FERTILISERS.—A firm of agents in Helsingfors desires to obtain the representation of British exporters. (Reference No. 215.)

DRUGS, CHEMICALS, MEDICINES AND PERFUMERY.—An agent in Berlin desires, on a commission basis, to represent a British firm. (Reference No. 219.)

PHOTOGRAPHIC CHEMICALS.—The Surveyor-General of Egypt is inviting tenders to be presented in Egypt by noon on May 11, for the supply of 4,030 rolls of photostat paper, 14,490 tins of developing powder, and 18,090 tons of acid fixing powder. (Ref. B.X. 3341.)

## The John Benn Hostel

### Lord Mayor Presides at First Annual Banquet

THE first annual banquet on behalf of the John Benn Hostel and Milner Hall was given by the East End Hostels Association at the Savoy Hotel, London, on March 11. There was a large and distinguished company present. The Lord Mayor, who presided, proposing the toast of "The London Boy," said that the main object of the dinner was to raise revenue for carrying on the splendid institution in Stepney which the Prince of Wales opened a few weeks ago. The second object was to make the dinner an occasion for directing public attention to the problem of boy life in the City of London. Mr. G. N. Barnes and Mr. J. J. Mallon, Warden of Toynbee Hall, responded. Sir John Simon proposed the toast of "The East End Hostels Association," and emphasised the importance of the scheme, to which Dr. Cyril Norwood, headmaster of Harrow, and Sir Ernest J. P. Benn replied. The toast of "The Chairman" was proposed by Capt. Wedgwood Benn, M.P. Sir Ernest Benn announced at the close that the sum of £1,950 which had been subscribed to the funds of the Association during the evening brought the total fund on behalf of the East End Hostels Association to £21,500.

### Third Census of Production

COAL mining, coke and by-products, manufactured fuel, and the railway carriage and wagon building trade form the subjects of the fourth of a series of preliminary reports on the third census of production, published in the current issue of the *Board of Trade Journal* (March 17, 1927).

# Commercial Intelligence

*The following are taken from printed reports, but we cannot be responsible for any errors that may occur.*

## County Court Judgments

*[NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.]*

PHILLI-MIRANO (1926), LTD., 39/49, Groton Road, Earlsfield, manufacturing chemists. (C.C., 19/3/27.) £15 13s. 10d. January 21.

WOODBRIDGE DRUG CO., Vale Place, Merridale Street, Wolverhampton. (C.C., 19/3/27.) £13 12s. 8d. January 25.

## Mortgages and Charges

*[NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.]*

HEPPELLS, LTD., London, S.W., chemists. (M., 19/3/27.) Registered February 28, mortgage or charge by way of collateral security for sums due under deeds dated December 22, 1924, June 2, July 30, August 20 and November 25, 1926, and any additional advances hereafter to be made, to F. J. M. Pyne and another, 15, Lombard Street, E.C.; charged on 460, Oxford Street, W., 465, Finchley Road, Hampstead, and 134, High Street, Kensington. *£199,300. November 29, 1926.

MANGER (J.) AND SON, LTD., London, E., salt and soda manufacturers. (M., 19/3/27.) Registered March 4, charge to Bank; charged on 3 and 3a, and 8 to 20 (even), Rosebank Road, 210 and 210a, Roman Road, and 2/4/6, Dane Place. *Nil. April 20, 1926.

### Satisfaction

INTERNATIONAL CHEMICAL CO., LTD. (late INTERNATIONAL CHEMICAL LABORATORIES, LTD.), London, N. (M.S., 19/3/27.) Satisfaction registered March 8, £10,000, part of amount registered April 27, 1926.

## London Gazette, &c.

### Companies Winding Up Voluntarily

JOHN BELL AND CROYDEN, LTD. (C.W.U.V., 19/3/27.) P. S. Booth, Certified Accountant (Association of Manufacturing Chemists), Kimberley House, 14-17, Holborn Viaduct, E.C.1, and H. Hackett, F.C.A., 448, Strand, W.C.2, appointed joint liquidators, March 4.

WEST YORKSHIRE OXIDE CO., LTD. (C.W.U.V., 19/3/27.) F. W. Hanson, Incorporated Accountant, Court Chambers, Jessop Street, Castleford, Yorks, appointed liquidator, March 3, 1927.

## Receivership

SOMERSET OXIDE AND OCHRE CO., LTD. (R., 19/3/27.) T. R. Morris, Incorporated Accountant, of 31, Queen Street, Cardiff, was appointed receiver in place of R. Dovey, on February 24, 1927, under powers contained in debenture dated November 9, 1923.

## New Companies Registered

POLLOPAS, LTD., 1, Oxford Street, Nottingham. Registered on March 5 as a private company. Nom. capital, £257,500 in £1 shares (130,000 "A," 120,000 "B," and 7,500 "C."). To adopt an agreement between G. W. Barrows and T. G. Foster of the first part, Kunstharzfabrik Dr. Fritz Pollak G.m.b.H. (=the G.M.B.H.) of the second part, the G.M.B.H. and Dr. Fritz Pollak of the third part, and the company of the fourth part. In particular to acquire the registered trade marks 452,881, 452,882 and 452,883, being the word "Pollopas," relating to goods in Classes 1, 39 and 50 respectively, and to carry on any business or industry concerned with synthetic or artificial resins and resin varnishes, synthetic or organic, glass and glass solutions, lacquers and the like, known as Juvelith, Kopan, Ivoit, Abalak, Pollopas and Shellan, etc. Directors: G. W. Barrows, A. G. Howitt, W. R. Hardwick, F. Pollak, and J. C. Vredenburg.

QUESTIER AND CO., LTD. Registered March 12. Nom. capital, £6,000 in £1 shares (3,000 "A" and 3,000 "B"). To adopt an agreement with G. J. A. Questier, and to carry on the business of manufacturers of and dealers in chemical and mineral fertilisers, basic slag and other articles and substances (natural and artificial) capable of being used for the fertilisation of the soil. Directors: W. A. Briscoe (permanent), 54, New Broad Street, London; G. J. A. Questier, and D. V. Tomson.

SUFFOLK CHEMICAL CO., LTD. Registered March 12. Nom. capital, £75,000 in 72,500 ordinary shares of £1 each and 50,000 deferred shares of 1s. each. Manufacturing, wholesale and retail chemists, druggists, drysalters, oil and colourmen, etc. To search for and explore any territories in any part of the world for phosphate, guano, carbonate of lime, phosphate of lime, nitrate, alumina, oxide of iron, etc. Subscribers: H. F. Pearce, 118, Manor Place, London, S.E.17; A. E. Hutton.

TAR RESIDUALS, LTD.—Registered as a private company on March 9. Nom. capital, £120,000 in £1 shares. Importers and exporters of, agents for and dealers in tar and pitch and coal-tar and petroleum products; chemical merchants, tar distillers, etc. Directors: M. M. Williams, 4, Fenchurch Avenue, London; S. A. Brashier; F. R. Tunks; W. C. Waugh; F. A. Waugh; G. E. von der Osten; A. Stanley; J. H. Hughes, and A. L. Swindells.

TRADE GRINDING, LTD. Registered March 11. Nom. capital, £11,000 in 10,000 10 per cent. cumulative participating preference shares of £1 each and 10,000 ordinary shares of 2s. each. Grinders and/or pulverisers of ores, minerals, metals, grain, chemicals, cereals, meals, vegetable and animal substances, etc. Directors: A. E. B. Rose, Lieut.-Col. The Hon. E. Thesiger, Capt. H. W. Young, Major E. H. Clifton, Dr. H. L. de Caux, Lieut. Adrian H. J. Stokes, R.N. (managing director), The Hedges, Bushey Heath, Herts.

### Operative Dyers' Wages

A CONFERENCE of the Joint Board Executive, representing some 80,000 operative dyers in Yorkshire, Lancashire, Cheshire, Derbyshire, and some parts of Scotland, was held on Saturday to discuss the position arising out of the three months' notice given about a month ago by the employers to terminate the common wage agreement after the operatives had declined to submit the question of a continuance of the Mackenzie bonus award to arbitration. At the close of the conference it was announced that the matter had been referred to the negotiation sub-committee with power to act.

### Benn Brothers' Other Journals

THE CABINET MAKER.—New Books; Supply of Furniture Designs; Furnishing Shipments in February; The John Benn Hostel: The First Annual Banquet.

THE ELECTRICIAN.—"Glyptal—a New Synthetic Resin," by H. Warren; The Measurement of Earthing Resistances; Exhibits at the Leipzig Fair.

THE FRUIT GROWER.—Exclusive Report of Western Commercial Conference; Can Orthodox Pruning be Improved? Fertiliser in Horticulture.

GARDENING ILLUSTRATED.—Violets for Frames; Setting Peach Blossoms; The Importance of Rest to Plants; Yussas and how to Grow Them; Early Vegetables.

THE GAS WORLD.—"Thoughts on the Distribution of Gas," by Walter Hole; Preparation and Uses of Gas Coke; The Measuring of Gas.

THE HARDWARE TRADE JOURNAL.—Hardware Exports in February; Wireless for the Retailer; Day by Day Problems of the Ironmongers.

THE TIMBER TRADES JOURNAL.—Timber Trades Federation: Annual Meeting and Banquet; Polish Timber Trade; Philippine Mahogany.